LIFE CYCLE SUSTAINMENT OF COMMERCIAL OFF-THE-SHELF (COTS) SUPPORT EQUIPMENT

SSCF RESEARCH REPORT

May 2012

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In supporting the warfighter, equipment for current and future missions has been procured through commercial sources to support construction, material handling, firefighting, and many other tasks. The equipment is categorized as commercial off-the-shelf (COTS) or a nondevelopmental item (NDI) with commercial market-proven components. This equipment is procured through programs of record, rapid initiatives (RI), operational needs statements (ONS) and Rapid Equipping the Force (REF) 10-liner documentation, or local leases/purchases to support a unit?s assigned mission.

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ABSTRACT

In supporting the warfighter, equipment for current and future missions has been procured through commercial sources to support construction, material handling, firefighting, and many other tasks. The equipment is categorized as commercial off-the-shelf (COTS) or a nondevelopmental item (NDI) with commercial market-proven components. This equipment is procured through programs of record, rapid initiatives (RI), operational needs statements (ONS) and Rapid Equipping the Force (REF) 10-liner documentation, or local leases/purchases to support a unit's assigned mission.

In many procurements, the item/system is modified, such as finishing it with chemical agent resistant coating (CARC), modifying the electrical system to accept a 24-volt North Atlantic Treaty Organization (NATO) slave receptacle and infrared or black-out drive capabilities, providing a ballistic crew or operators compartment, adding weapons or military equipment racks, lift and tie-down points, fuel system modification to support jet propellant (JP)-8 fuel, and other minor mission-related enhancements.

This research product addresses the need for COTS/NDI systems to have a complete System Support Package (SSP) that includes organic maintenance support throughout the systems' life cycles. Organic maintenance support is the ability of the operating unit to upkeep and repair the system using internal support and resources.

Using the data collected from two recently fielded Army engineer systems, this study attempted to answer the question "Is organic maintenance support required for full life cycle sustainment of COTS/NDI systems?"

The research is centered on collecting data from operators, maintainers, and leaders from the field who have experience with either the Backhoe Loader (BHL) or High Mobility Engineer Excavator (HMEE). Survey solicitations were sent to 242 Army engineer unit identification codes (UICs—UICs identify detachments, platoons, or companies) who received one or more of the 433 BHL or 269 HMEE systems issued. Both systems were fielded using contractor logistical support while the organic maintenance support plan could be designed and developed. Data collected address how these two systems were maintained in contrast to other systems in the unit and if there were any significant issues while executing unit missions in the area of logistical support.

This research paper does not address COTS/NDI equipment used in communications, automation support, chemical or biological detection, or software acquisition.

CHAPTER 1
INTRODUCTION

Background

The High Mobility Engineer Excavator (HMEE) Type I, the heavy variant of the HMEE family, was established through the August 2000 Operational Requirement Document (ORD) and originally required the procurement of 1,546 systems to support Army Engineer material handling and excavation missions.

This system is a C-130 transportable 26,000-pound unit with mission-driven attachments, is approximately twice the size and weight of the Fiscal Year (FY) 1985 procured Small Emplacement Excavator (SEE), and is designed with a stronger bucket breaking force to support missions of the heavier mechanized forces.

Base configuration is a 1 cubic yard front bucket, a .27 cubic yard front hoe, and attachments such as a 6,000-pound forklift, sweeper, snowblower, sandbag filler, and plow. It has a hydraulic tool suite with chainsaw, air hammers, rock drills, augers, and other pioneer-related tools. The base model is built by JCB Inc. (named after its founder. J.C. Bamford) in Pooler, GA. A picture of the current production representative HMEE system is located at Figure 1. The HMEE has a removable armored crew protection kit (CPK) capable of providing protection from improvised explosive devices (IEDs) and small arms fire, and can travel 65 miles per hour on hard surfaces. This system was fielded with contractor commercial contractor logistical support (CLS) in lieu of organic unit logistical support.

Photo by Army Test and Evaluation Developmental Test Team

Figure 1. HMEE Type I Systems with CPK

CLS is defined as external nonmilitary support usually provided by the system vendor or other commercial contractor who can repair and perform services on the system. In most cases, this support is provided through a supplemental contract and is independent of warranty-related repairs or services.

The Backhoe Loader (BHL) started out as the HMEE Type III program and was originally introduced by Caterpillar Inc. during the 2003 vendor solicitations to provide an existing tractor to the Army. It is a modern version of the John Deer 410-D backhoe of the late 1970s and it is a non-self-transportable digging asset in the field used to support lines-of-communication installation, to counter emplaced mobility obstacles, to support mobility, and for general construction excavation. Case Inc., (named for its founder, J. I. Case) received the final contract during solicitations to produce approximately 700 systems over a 5-year period starting in 2006.

A picture of the current production representative BHL system is located at Figure 2. The BHL requires a tractor-trailer to transport it to the job site and has a maximum effective road speed of 20 miles per hour if it must be driven from mission location to location. The BHL system, like the HMEE Type-I, was fielded using CLS. The program manager (PM) has added an armored CPK to meet Coalition Forces Land Component Command (CFLCC) requirements for use in Operation Enduring Freedom, and both systems were used to support Operation Iraqi Freedom/New Dawn.

Photo by Army Test and Evaluation Developmental Test Team

Figure 2. BHL System with Commercial Crew Compartment

As of the date of this document, neither the HMEE nor the BHL systems meet acquisition requirements for full material release due to shortfalls in supportability according to Army Regulation (AR) 700-142. In addition, both systems, as systems of record, still are required to transition to organic sustainment to meet the systems full life cycle maintenance requirements as identified in AR 700-127.

Problem Statement

Is organic maintenance support required for full life cycle sustainment of COTS/NDI systems?

Purpose of this Study

This study looks at how CLS has been used during the initial fielding of the BHL and HMEE in the absence of organic unit maintenance. The maintenance elements and requirements in AR 700-127 as they apply to COTS/NDI systems and how this may differ from application to developed systems will be used as the baseline for this study. Due to the war effort, many COTS/NDI systems were issued to deployed units after meeting minimal material release requirements by using CLS to meet short-term maintenance requirements. With most systems, fielding and support plans were drafted to emplace organic maintenance later. Logistical requirements such as parts provisioning, technical manuals (TMs), and maintenance allocation chart (MAC) production, identifying repair parts demand using reliability or contractor supplied repair data, operator-maintainer training packages, and a logistics demonstration (LD) to verify their accuracy were not in place as of the date the data were collected for this report.

If organic Soldier support is the life cycle maintenance strategy, then a suitable support concept and system support package (SSP) is required and must be developed by the program management office (PMO). The SSP includes all the items listed above along with test, measurement, and diagnostic equipment (TMDE) compatibility. This becomes a significant challenge for the PMO fielding COTS/NDI equipment, for most COTS/NDI systems are on a shortened acquisition cycle (as short as 12 months).

With many systems purchased to support CFLCCs effort, the SSP development is overlooked, is abbreviated, or CLS is the maintenance plan until the SSP development (typically 2 to 4 years if done correctly) can be completed for the procured system.

AR 700-142 provides guidance on the requirements for levels of material release. A system with full material release (FMR) is considered safe, suitable, and supportable within its

operational parameters. Adequate, cost-effective sustainment support is required for COTS/NDI systems, just as with developed systems. Department of Defense Instruction (DoDI) 5000.02, December 2008, states that COTS/NDI procurement is the preferred method of acquisition with the intent of lowering total life cycle costs (LCC). This allows the COTS/NDI system to enter the acquisition cycle at Milestone C for programs of record, saving the system costs associated with development. The BHL and the HMEE COTS/NDI systems that have passed the first unit equipped (FUE) milestone are identified in Appendix B and C by unit identification code (UIC). Report data were collected from the system operators, maintainers, and leaders at these UICs.

Significance of this Research

This research looks at the supportability of COTS construction equipment using CLS and compares it to supportability of COTS construction equipment fielded with organic logistical support. It addresses issues identified under both types of support and provides discussion of whether CLS should replace organic support under certain instances.

Overview of the Research Methodology

The data supporting this research were collected mainly via a participant survey. All participants are operators, maintainers, or supervisors of operators or maintainers of a BHL or a HMEE system. All participants completed the demographics portion of the survey followed by a series of questions that pertained to their functional area with respect to the BHL or HMEE (operators answered operator-related questions, maintainers answered maintenance-related questions, and supervisors answered questions on system performance, training, and mission interface). The surveys were distributed by Army Knowledge On-line (AKO) e-mail using the group capability with rule sorting to identify individuals in the units who were issued the BHL or HMEE. Rules were written to sort AKO mail addresses in the general address book by UIC and Military Occupational Specialty (MOS), targeting the operators, maintainers, and supervisors by an e-mail. A letter was then sent to these groups containing the links of the survey locations to support electronic collection through the web using the SurveyMonkey tool for collection. The survey was distributed, populated, and then collected by the web tool as an e-mail attachment. A copy of the survey instrument is located in Appendix A.

Attachment data were analyzed in Microsoft Excel and merged with the SurveyMonkey data to complete the analysis. Any subjective data collected through the comment sections of the

survey that required additional investigation or clarification were documented through follow-on e-mail correspondence or phone interview. The results of this effort are found in Chapter 4.

Research Questions

Is organic maintenance support required for full life cycle sustainment of COTS/NDI systems?

Research Hypothesis

Organic maintenance support is required for full life cycle sustainment of COTS/NDI systems.

Objectives and Outcomes

The degree of supportability currently in place with the BHL and HMEE systems and their current supportably strengths and shortfalls to the warfighter were subjectively assessed. Survey participants identified how the systems were affected by CLS from an operator and leadership perspective, any mission limitations as observed by key unit operators, maintainers and leaders, and the effects CLS on the LCC of the select COTS/NDI systems. This report identifies findings and makes recommendations to management on changes necessary to plan for and sustain current COTS/NDI equipment based on the responses of the BHL and HMEE operators, maintainers, and supervisors.

Limitations of the Study

Sample size is limited to operators, maintainers, and leaders within Engineer Units who have been exposed to CLS of the BHL and HMEE and the ability of the participants to compare their experiences to that of organic logistical support to similar systems within their units. At this time, there are 433 BHL systems issued to Army Engineer Units, which have been issued to 28 Active Component UICs, 89 Army National Guard (ARNG) UICs, and 56 Army Reserve (USAR) UICs. One hundred seventy-three UICs were used through AKO group e-mail capability to capture operator, leader, and maintainer addresses for the BHL. The remaining 236 systems (of the 669 total procured to date) are issued to training units, headquarters units, or nonengineer units like Quartermaster or Military Police Companies, and were not contacted, nor were they part of the data collection effort.

Sample size for the HMEE was limited to 269 systems, which were issued to 44 Active Component Engineer UICs, 18 ARNG UICs and seven USAR UICs. Sixty-nine UICs were used

through AKO group e-mail capability to capture Operator, Leader, and Maintainer addresses for the HMEE.

Validity of the Research

The survey instrument will be used for the first time with this sample size. It has no proven validity from use at this time. The survey was reviewed by subject matter experts from the program office and the Maneuver Support Center of Excellence (MSCoE).

Reliability of the Responses

The reliability of the responses is estimated to be high even though the survey instrument is being used for the first time. Survey respondents (operators, maintainers, and leaders/supervisors) have training on both the system and those that were replaced by the BHL or HMEE. The data sorted and analyzed by respondent group reflect accurate feedback to support the research questions.

CHAPTER 2
LITERATURE REVIEW

Research Project Requirements

This literature review is intended to determine what information currently exists for the support used to maintain (COTS/NDI) systems. The focus of this research paper is on construction and material handling equipment, and construction-related tools and tool sets.

A review of SD-2 "Department of Defense (DoD) Acquisitions, Buying Commercial Items and Nondevelopmental Items," published January 2010 by the Defense Standardization Program Office, found that it references Part 12 of the Federal Acquisition Regulation (FAR). This FAR section requires governmental agencies to use COTS and NDI "to the maximum extent practicable" to meet agency needs. Where commercial items can be used, with some limited modifications, to meet the requirements for a material solution to a Capabilities Production Document (CPD), such items, in most cases, will require some type of logistical support for routine maintenance, repair, and services throughout the system's projected life cycle. SD-2 addresses the challenges and possible mitigation approaches in its Table 1 (found on p. 6 of the January 2010 version of *SD-2, DoD Acquisitions)* (Saunders, January 2010).

With the BHL and HMEE, as with other construction, material handling and tool sets, it is not so much the risk of the vendor going out of business but more of changes in technology and changing civilian production requirements such as the need for cleaner engines (mandated by governmental agencies like the Environmental Protection Agency) required by the commercial industry to keep up with national standards. If the government can support the commercial product in-house using organic maintenance, it eliminates the need to support a system with CLS during deployment where security of commercial service providers, requirements for security clearances, and overall personnel salary and transportation costs are exponentially higher.

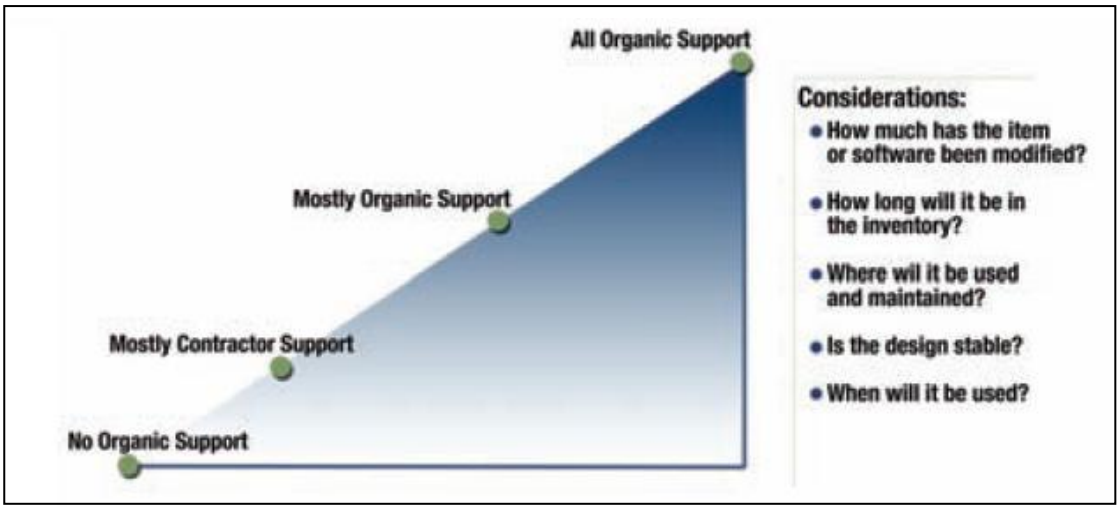
Table 1. Challenges and Mitigation Approaches: Commercial Products and NDIs

Challenge	Mitigation Approaches
Performance in military environment	Conduct product verification testing. Test product samples. Use test beds.
Costs for frequent upgrades	Budget up-front for expected upgrades. Determine acceptability of less frequent upgrades.
Risk that desired features or performance may be changed unilaterally by the commercial firm	Participate in supplier-customer forums to influence designs. Determine if other suppliers exist. Determine whether the government can maintain desired features.
Risk that supplier may go out of business or leave the industry	Determine if alternative vendors exist. Use open interface standards. Determine whether the government can support the product if necessary.
Integration of various commercial items/NDIs into system	Use independent consultants/advisors with expertise in integrating commercial items. Use open interface standards Determine how integration of multiple items affects overall performance.
Costs of testing to ensure performance	Plan for less developmental testing but more operational and performance testing.
Configuration management	Adapt to industry cycles where possible. Determine if less frequent upgrades are possible without compromising supportability of older items. Budget and plan for licenses to obtain access to required technical data.

SD-2 also addresses the scope of logistical support methods from no support (where the item is disposed of—not repaired), to where the item has CLS, to where the item has 100 percent organic support throughout its life cycle. Table 2 is an extract from SD-2, p. 18, and illustrates different degrees of CLS. In the case of construction equipment, it can have mostly contractor support like the BHL or HMEE, have full organic support such as the current bulldozer, or have no support such as individual tools in most tool kits that are simply replaced through the system when broken. *(Table 2 is found in the January 2010 version of SD-2, DoD Acquisitions)*. (Saunders, January 2010)

COTS/NDI systems also need to be evaluated for their subsystems and the ability to be updated. Using continuous modernization as a process to keep up with some construction equipment may be possible to increase reliability and lower sustainment costs. Current construction model production ranges from 2 to 8 years, with the average production line lasting approximately 5 years. Defense Acquisition University (DAU) LOG 235 is a course on Performance Based Logistics (PBL), and includes analysis of key areas affected by modernization.

Table 2. Spectrum of Logistical Support for Commercial Products



Continuous modernization of a system must anticipate obsolescence and emerging requirements and ensure technologies are available to satisfy emerging requirements. Table 3 identifies some of the areas affected by the types of modernization and their associated results. (Table 3 is within the course text of DAU LOG 235). (DAU, Performance Based Logistics-LOG 235 Slides, 2012)

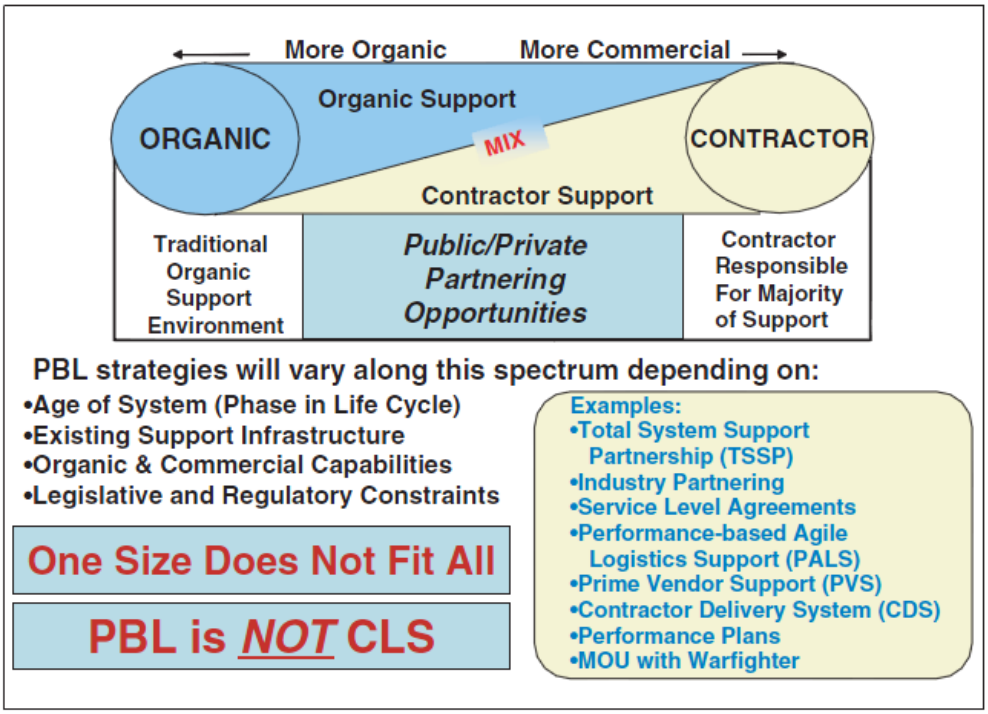
COTS/NDI systems can support modernization as a series of updates or as a continuous modernization, as commercial manufacturers will continue to make changes through model updates and technology insertion and upgrade to keep up with competition. The BHL and HMEE were considered the best value, and considered to have mainstream technology at the time of the initial procurement, but were not considered for continuous modernization and will remain with the procured technology unless a decision is made during a future reset or during life cycle replacement to upgrade the system. COTS/NDI systems will have commercial CLS available through their parent company or one of the prime vendors and can be contracted if necessary as back-up support if organic support is not readily available.

Table 3. Modernization Options

	Modernization through Acquisition	Modernization through Upgrades	Continuous Modernization
Funding Base	Acquisition: subject to political priority and availability		Operations and Maintenance for form/fit/function-like reliability improvements
Life Cycle Cost	High	Moderately high	Low: market-driven
Cycle Time	Long	Short	Short
Use of Modern Technology	Point solution: may be obsolete before available		Refreshed with most current & mature commercially available
Time to Market	10-15 years	5-10 years	8-12 months
Service Life	20 years	5 years	Indefinite
Customer Base	Small		Broad
Testing Cost	High	Moderately high	Low to Moderate
(Re)certification Cost	High	Moderately high	Low or none
Satisfaction	Requirements may change before system available		Immediate
Sustainment Cost	High: old system and supply chain	High: replacement cost	Low: smaller inventory investment
Sources	Single or few		Multiple
Supply Chain	Develop and initialize	Modify and reinitialize	Immediate
Availability	Fielded over time		Immediate via spares insertion

Another area that looks at the organic vs. CLS support is Performances Based Logistics (PBL). It's cost-effectiveness with respect to warfighters' operational requirements is validated by a Business Case Analysis (BCA). (Table 4 is found on pp. 2-3 of *PBL: A Program Manager's Product Support Guide.*) (DAU, *Performance Based Logistics: A Program Manager's Product Support Guide*, 2005)

Table 4. Spectrum of PBL Strategies



With respect to Table 4, both the BHL and HMEE are considered new systems and are expected to remain in the Army system for approximately 20 years. Both vendors have a corporate support structure in place to service and repair their commercial fleets that are either leased or sold to the public. The Army is using CLS for both the BHL and HMEE as it continues to transition to organic maintenance. To date, both systems have completed parts provisioning, are finalizing and preparing to publish TMs and maintenance allocation documentation, and are preparing training programs of instruction for both new operators and maintainers. The current CLS falls under prime vendor for BHL and HMEE, and each vendor has 100 percent responsibility for maintenance service and upkeep, unless there is a Memorandum of Understanding (MOU) with a deployed unit due to mission location. In this case, the unit assumes evacuation responsibility of a nonfunctional system, and transports it to a secure location before the contractor can repair the system. In existing CLS contracts, with the possible exception of Special Operations Command (SOCOM) or State Department-issued contracts, contractors do not venture into battle space geographically past the Brigade Support Area (BSA) to support maintenance operations during combat operations.

Ronald J. Kohl from Titan Systems addressed determining COTS component suitability in mission critical systems in a presentation to the engineering section at Virginia Tech University in February 2002. Mr. Kohl started the presentation by defining COTS and NDI systems, and defined mission critical as "Those parts of an enterprise or system which are essential to the success of that enterprise or system." (Kohl, 2002) Although the presentation focused on computer and enterprise-related technology, the potential benefits of using COTS were similar to those related to construction equipment. Mr. Kohl emphasized that using COTS and NDI products would reduce development costs, reduce procurement schedule, reduce maintenance costs, provide a proven product, and would have industry investment in the technology base.

This presentation also listed the risks associated with procuring COTS as a solution. The first risk listed was product volatility. Unlike electronics and software, which can require monthly updates, the average construction equipment model updates can vary from 2 to 10 years, depending on the technological improvements in the construction field. Some COTS items offer little or no insight into the product (such as limited documentation or proprietary intellectual property), may have unknown product flaws, may not meet program requirements (such being as unsuited for some military use), or the product lifetime may be less than the intended program life. There also may be some risk to maintenance such as unpredictable vendor support, vendor stability, vendor resistance to accepting or fixing external identified flaws, and reliance on the vendor to identify problems with the system as the product is used throughout the life cycle.

Mr. Kohl's mitigation techniques, although more than 10 years old, can be applied today, for the commercial marketplace has experienced little change in business practices. When using COTS items, he suggests organizations should gain marketplace and vendor knowledge, gain product knowledge prior to base-lining system requirements, have a COTS standard for the program, identify redundant vendors, invite early vendor involvement then and throughout the system life cycle, and have a product and vendor certification process. He closes out his presentation with some of the open problems he has experienced, such as defining complete COTS-based systems development and operational life cycle models, having more objective evaluation and selection criteria, having effective cost-estimation algorithms, and establishing firm verification and validation methods.

The *Department of Defense Warranty Guide* discusses the Federal Acquisition Streamlining Act of 1994 and notes that contracting officers are required to take advantage of commercial warranties to the maximum extent practicable, and the warranty terms and offers of extended warranties should be the same as those offered to the general public during a purchase of a COTS item. "The standard practice is to accept the manufacture's commercial warranty that is typically some form of materials and workmanship guarantee." (DoD, September 2009). When the government procures a COTS system, the request for proposal should seek to identify what warranties are available, and the government's legal staff should review all offers. The commercial warranty should not affect pricing, delivery, or financing and should be viewed as a negotiable item based on what is available during market research and can be tailored, based on the size of the procurement. Warranties should be considered in the planning if CLS is to be used during any portion of the fielding process as a way to reduce support costs.

Revision 5 of the Defense Logistics Acquisition Directive (DLAD) addresses COTS procurement in Part 12. (DLA, May 2000) This section also covers minor modifications that are usually made to a COTS construction or material handling system or toolset to enhance the systems military utility. In most cases, these modifications include modifications in transportability (such as tie-down and lift provisions, organic shipping, or transport containers). Modifications also are made in the area of survivability such as painting the system with CARC to support decontamination operations or adding an armored CPK to support tactical operations in areas where enemy small arms fire, mortar, grenade, or IEDs may be used. Some additional modifications seen in most systems are a NATO slave adapter to support maintenance operations, a weapons rack for individual weapons, and storage compartments for individual items of equipment.

Part 12 also provides amplifying guidance, such as, "An item does not have to be developed at private expense to be commercial; except that nondevelopmental items must have been developed exclusively at private expense to be considered commercial." (DLA, May 2000) The HMEE is an NDI item where JCB took one of its fast-track farm tractor systems and modified, it using its backhoe and loader attachments, resulting in a backhoe loader with road speeds in excess of 65 miles per hour to support movement with the STRYKER Brigade Combat Team (SBCT). Additional guidance can be found on the processes to procure COTS and NDI or systems in the FAR.

CHAPTER 3
RESEARCH METHODOLOGY

This research project addresses the need for COTS/NDI systems to have a complete System Support Package (SSP) that supports organic maintenance support throughout the systems life cycle. It provides data to answer the question "Is organic maintenance support required for full life cycle sustainment of COTS/NDI systems?

Research Hypothesis

1. Organic maintenance support is required for full life cycle sustainment of COTS/NDI systems.
2. CLS can sustain a COTS/NDI system throughout the systems full life cycle.

Research Process

The data supporting this research were collected mainly by using a participant survey. All participants were operators, maintainers, or supervisors of operators or maintainers of a BHL or a HMEE system. All participants completed the demographics portion of the survey followed by series of questions that pertained to their functional area with respect to the BHL or HMEE (operators answered operator-related questions, maintainers answered maintenance-related questions, and supervisors answered questions on system performance, training, and mission interface). Attachment data were analyzed in Microsoft Excel and merged with the SurveyMonkey data to complete the analysis. Any subjective data collected through the comment sections of the survey requiring additional investigation or clarification were documented using follow-up e-mail correspondence or phone interview.

Data Collection

I created the surveys used for the data collection. The survey instruments were distributed to address the degree of supportability currently in place with the BHL and HMEE systems using CLS. Responses were compared across units (Active, USAR, and ARNG) and the data provided on the unit's use of organic maintenance on COTS or similar systems. All participants were operators, maintainers, or supervisors of operators or maintainers of a BHL or a HMEE system and are current members of the Active Component Army, USAR, or ARNG.

How Were the Data Collected?

All participants completed the demographics portion of the survey, followed by series of questions that pertained to their functional area with respect to the BHL or HMEE (operators

answered operator-related questions, maintainers maintenance-related questions, and supervisors questions on system performance, training, and mission interface). The surveys were distributed via AKO e-mail using the group capability with rule sorting to identify individuals in the units who were issued the BHL or HMEE. Rules were written to sort AKO mail addresses by UIC and MOS to target the operators, maintainers, and supervisors by e-mail. An e-mail letter was then sent to these groups containing the links of the survey locations to support electronic collection. The links connected the participant via the web tool, SurveyMonkey. This is a collection medium where the survey was distributed, populated, and then collected by the web tool. The SurveyMonkey files were downloaded to a DAU computer workstation and were transcribed or copied into Microsoft Access or Excel for analysis. The survey instrument used is located in Appendix A.

CHAPTER 4
FINDINGS

The objective of this research is to collect data from units that have been issued either the BHL or HMEE and are using CLS in place of organic maintenance support and see if the responses indicate whether organic maintenance support is required for full life cycle sustainment of these COTS/NDI systems.

Population and Sample Size

Throughout the period January 31 through February 3, 2011, e-mail requests for survey completion were sent to 76 unit representatives, using a manual search of unit UICs within the AKO documents section. On February 7, assistance was requested from the AKO help desk to compile a list of e-mail addresses of operators, leaders, and maintainers using AKO Rule Based Groups (RBGs) sorting against UICs in the distribution lists of the BHL and HMEE and the Military Occupation Specialty (MOS) identifiers to sort survey participants by AKO e-mail addresses. These lists were then used to contact operators, leaders, and maintainers directly to solicit data through the SurveyMonkey web collection survey process. Using the RBG process, 3,924 e-mails, which identified Soldiers in the UICs receiving the BHL and the HMEE were sent between February 21 and March 31 to members in the 12B, 12H, 12N, 12X, 12Z, 91B, and 92L MOSs. Attempts also were made to locate Soldiers in 12E, 12J, 120A, 123A, 915A, and 919A MOSs, but the RBG process filed to populate the groups.

As of March 26, survey responses were returned from 62 operators, 53 leaders, and 9 maintainers. These data, once reviewed for completeness, resulted in completed responses from 55 operators (30 for the BHL and 25 for the HMEE), 43 leaders (25 for the BHL and 18 for the HMEE), and 7 maintainers (3 for the BHL and 3 for the HMEE). There were five sets of duplicates, of which three surveys were not populated and multiple surveys (two operator and two leader surveys) were accepted when two leaders submitted completed data as both leaders and operators. There were 124 surveys collected by SurveyMonkey. Five were duplicates from Soldiers populating two surveys in different tables, which resulted in 119 sets of unique demographic inputs. Figure 3 reflects the population by survey type.

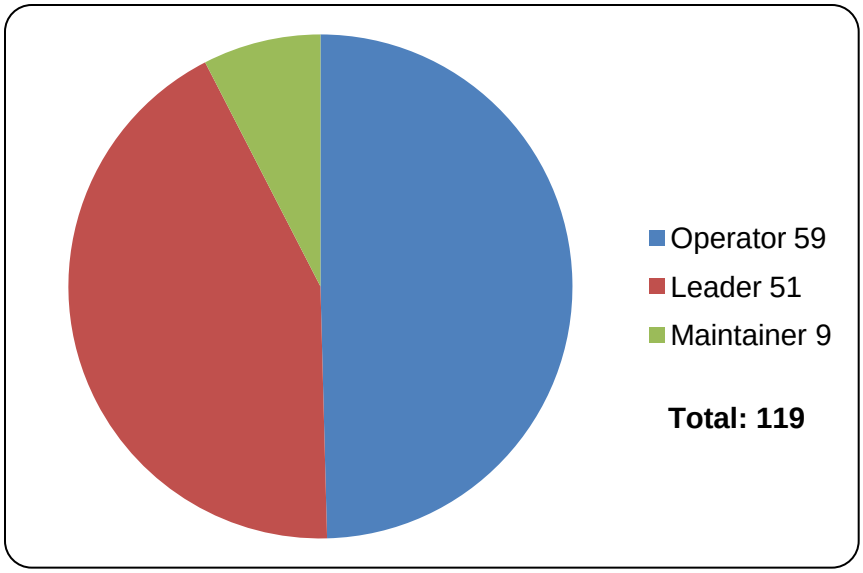


Figure 3. Total Demographics by Survey Type

Nineteen participants failed to complete the second page of their respective surveys, thus only submitting demographic data and no CLS-related data, so the count for CLS-related data was reduced to 105 surveys, of which 103 were from unique participants (accounting for the two multiple submissions as both leader and operator). Figure 4 reflects total surveys by type submitting CLS data.

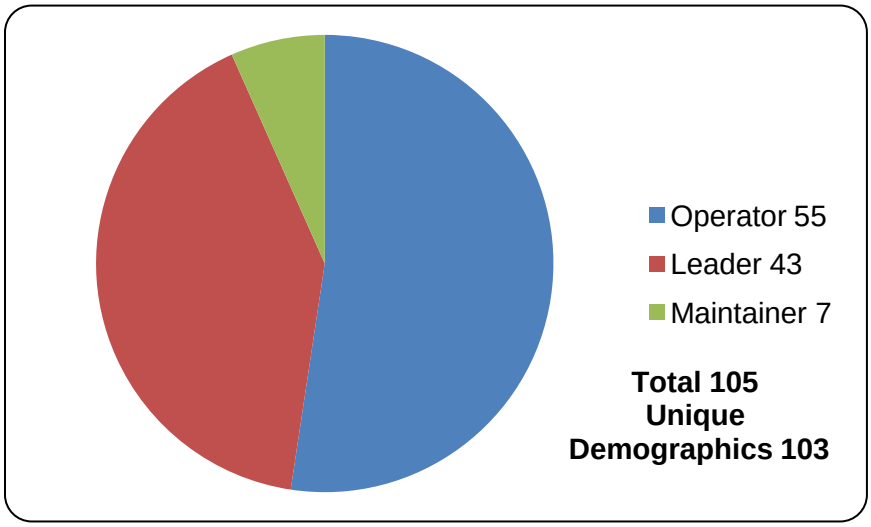


Figure 4. Total Surveys by Type Submitting CLS Data

Collected Data—Demographics

Survey templates for operator, leader, and maintainer are located in Appendix A. The demographic data collected were the same for all three surveys and consisted of 11 questions. An asterisk identifies a field that the survey participant was required to fill. Table 5 identifies the demographic questions answered by the survey participates.

Table 5. Demographic Questions

*	1	Last Name
	2	E-Mail Address
*	3	Rank: PVT-SPC, SGT-SSG, SFC, MSG-1SG, LT, CPT, WO-CW
*	4	Primary MOS
	5	Skill Level
	6	Secondary MOS
*	7	Unit Identification/Location
	8	Work or Contact Number
*	9	What system are you completing this survey for? BHL or HMEE
*	10	What is your duty position? Operator, Leader/Supervisor, Maintainer
*	11	How many months have you worked with this equipment?

Although 119 sets of demographic data are available, only the data from the 103 unique participants who completed the CLS data are displayed in this report. The multiple surveys were submitted by participates in the rank of SGT-SSG, and were both in the MOS of 12N. They are reflected in the individual survey charts but are not counted as duplicates in the totals chart, accounting for the difference between 105 in the sum of the surveys and the total of 103 for unique participants. The following chart sets reflect the demographic data collected: Figure 5 reflects distribution between surveys of the Soldiers' rank and total of rank by population. Figure 6 reflects the population by MOS by survey type and total submissions. Figure 7 reflects survey submission by system type, and Figure 8 is a breakdown of population by the time participants either were operating, maintaining, or supervising the operation of the BHL or the HMEE systems in their units prior to participating in these surveys.

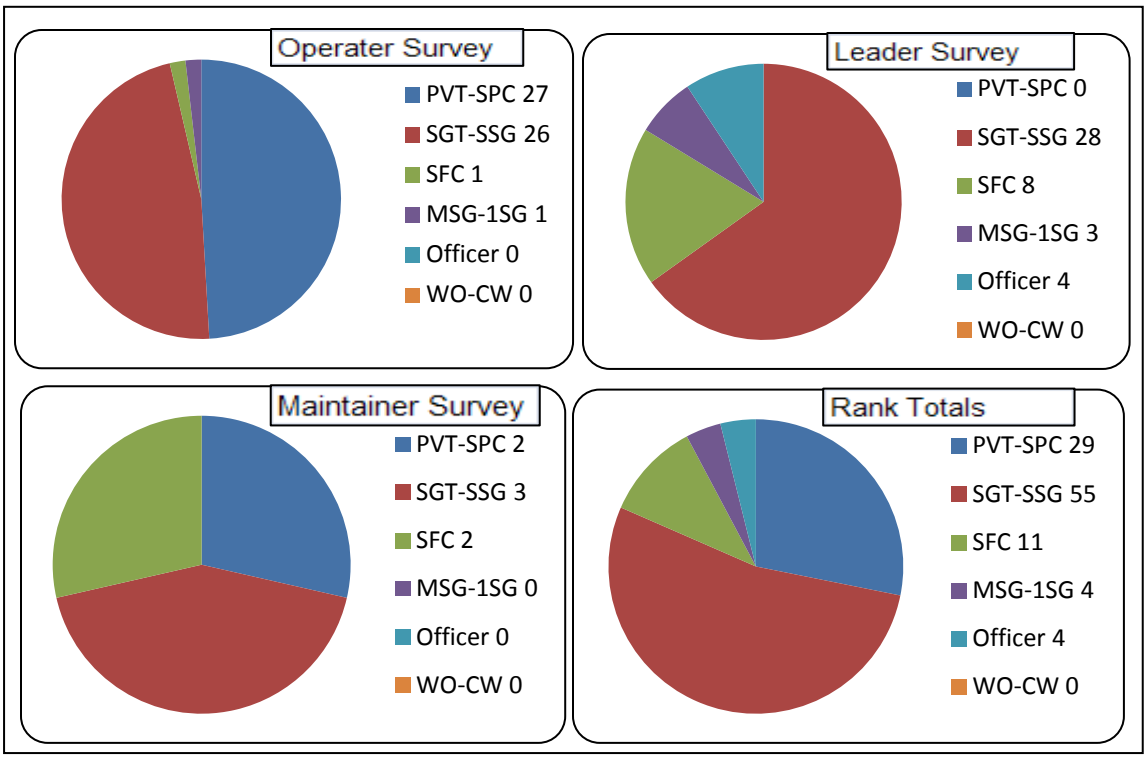


Figure 5. Question 3: Soldier Rank by Survey Type/Totals

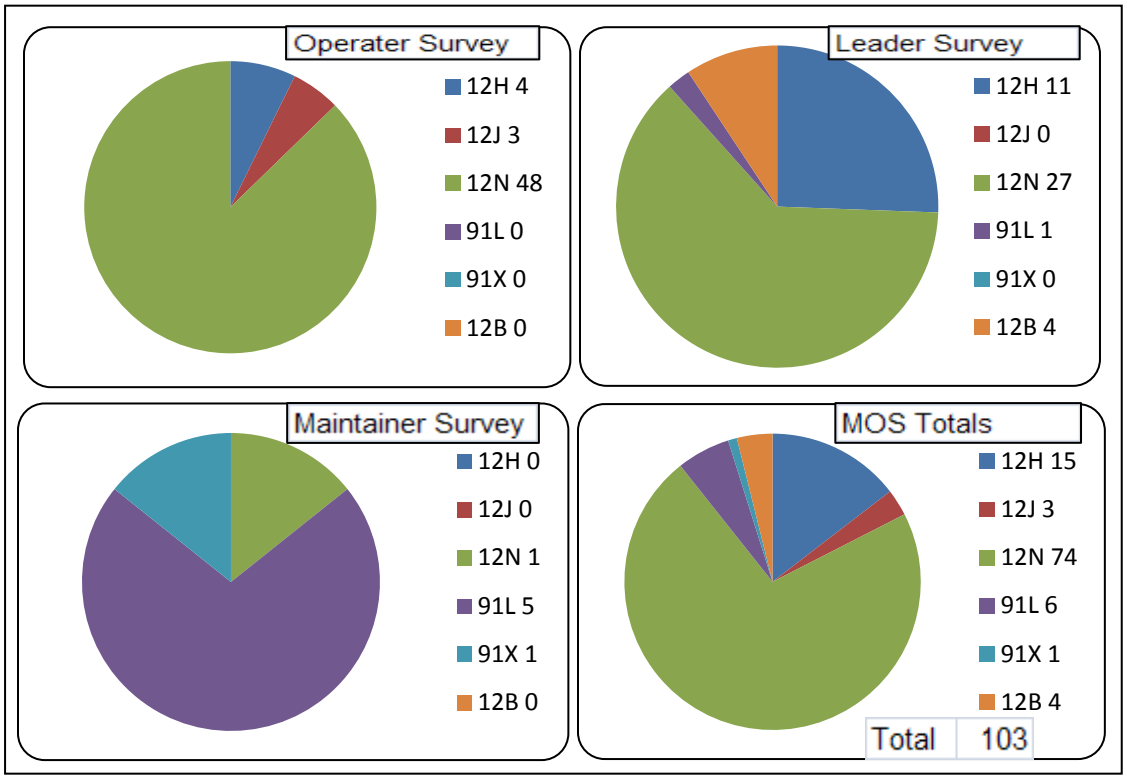


Figure 6. Question 4: Primary MOS by Survey Type/Totals

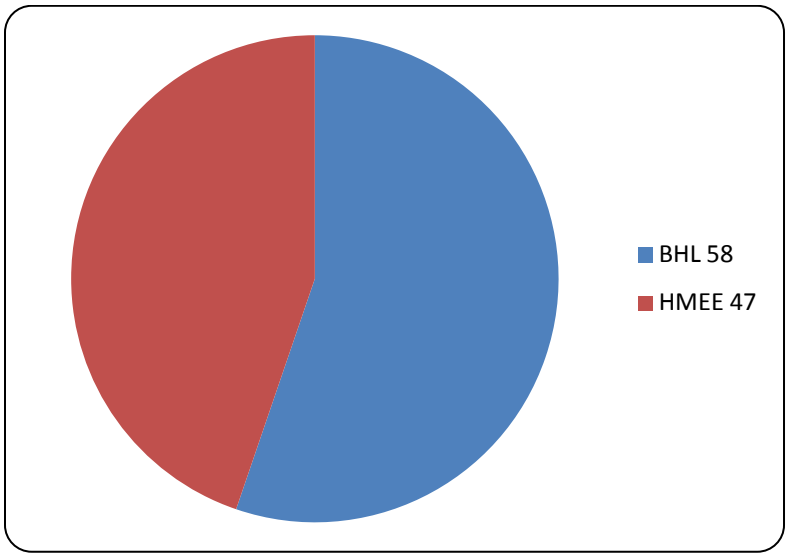


Figure 7. Question 9: Surveys by System Type

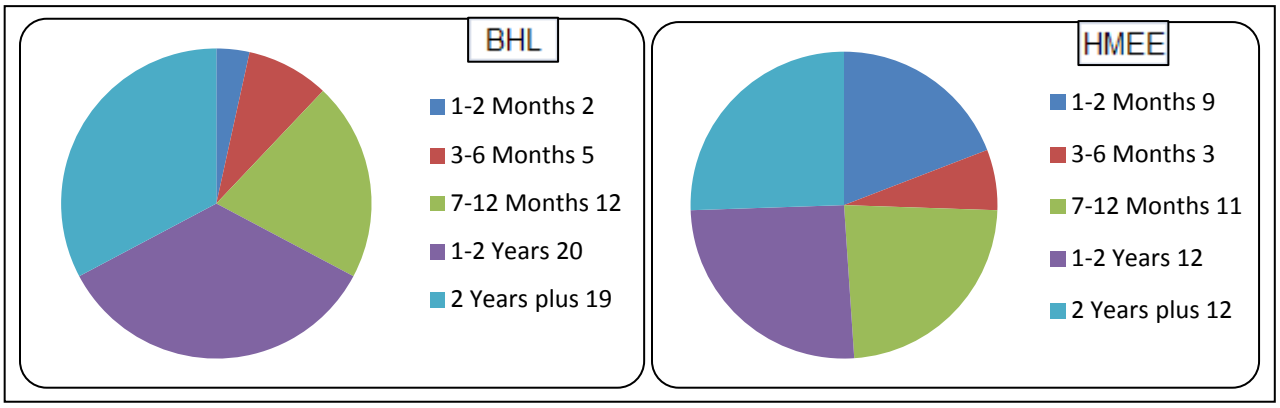


Figure 8. Question 11: Months of Experience by System Type

Remaining demographic data are available in the survey database. Remaining entries such as last name, UIC, participant e-mail address, and work telephone number were captured to support further demographic analysis if trends were identified in the CLS data. This research was not intended to complete a full human factors analysis at this time.

Collected Data—CLS Related

Training and Manuals

Part 2 of each of the three survey instruments contained questions relating to training, system manuals, unit operations, and system maintenance, with the opportunity for the respondent to close out the survey with any comments on CLS or unit maintenance. The operator and maintainer surveys contained an additional 13 questions, and the leader survey contained an

additional 15 questions. Table 6 lists the training and TM related questions for the BHL and HMEE. Questions are listed by survey instrument in the table (operator, maintainer, and leader), but responses are broken out by area where the same questions are asked across multiple instruments. Again, the questions preceded by an asterisk required a response by the survey participant.

Table 6. Training and Manual-Related Questions

Operator		
*	12	Identify the source of training you received on the system.
	13	Did you receive training materials on the system?
*	14	Did you receive or have access to an operator's manual for PMCS?
	15	Did any of the manuals cover operator level maintenance tasks?
Maintainer		
*	12	Identify the source of training you received on the system.
	13	Did you receive training materials on the system?
*	14	Did you receive or have access to maintenance/parts manuals?
Leader/Supervisor		
*	12	Were you satisfied with the training your operators received on the system?
*	13	Were you satisfied with the training your maintainers received on the system?
	14	Did your unit receive training manuals on the system?
*	15	Did your unit receive sufficient maintenance/parts manuals for the system?
	16	If your unit received training from the CLS Vendor, was it adequate?

Operator and maintainer responses (Question 12) identifying training sources are combined in Figure 9 followed by leader responses (Questions 12 and 13) to training satisfaction in Figure 10. Operator and maintainer responses to training manuals (Question 13) are displayed alongside leader responses (Question 14) on training manuals in Figure 11. Figure 12 addresses operator Preventative Maintenance Checks and Services (PMCS) manual availability and maintenance tasks at the operator level (Questions 14 and 15). Figure 13 addresses parts manual availability from a maintainer (Question 14) and leader perspective (Question 15). This section closes with the leader responses (Question 16) on CLS-provided training to the unit in Figure 14.

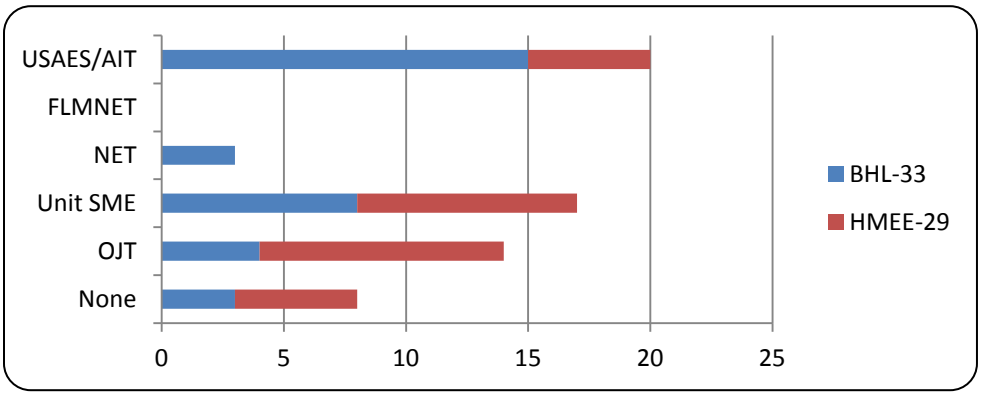


Figure 9. Question 12: Source of Training Operator/Maintainer

Of the 62 operators and maintainers responding to the training questions, 32 percent were trained by the United States Army Engineer School (USAES) Advanced Individual Training (AIT) program, 27 percent were trained by Unit Subject Matter Experts (SMEs), 23 percent learned from on-the-job (OJT) training, and 5 percent learned from new equipment training (NET) teams. Thirteen Soldiers identified receiving no system training at all. No maintenance participants responded receiving training from a field-level-maintenance new-equipment training (FLMNET) team.

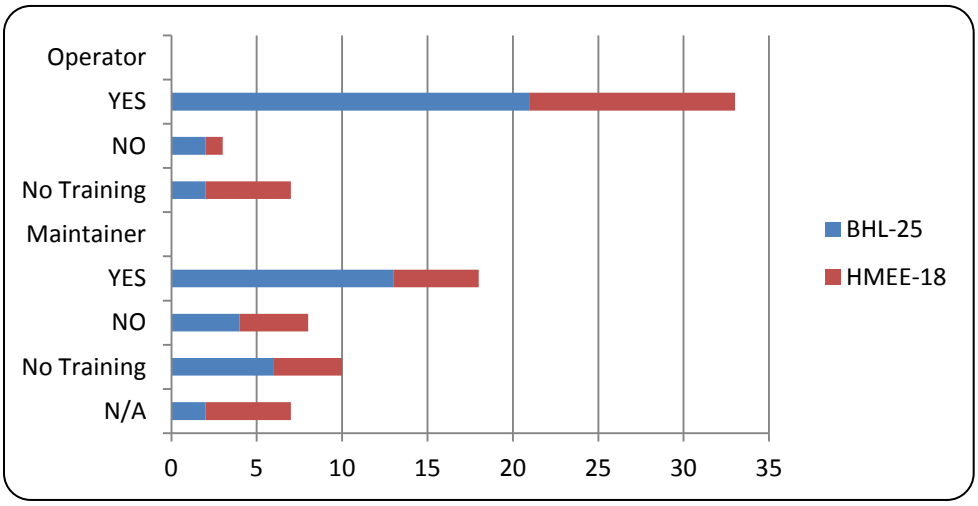


Figure 10. Leader Questions 12 and 13: Satisfaction with Training

For the 43 leaders responding to the unit training satisfaction questions, of the 84 percent who had units who received operator training, 92 percent were happy with the operator training

received. Of the 60 percent of the units who received maintenance training, 69 percent of the leadership was happy with the degree of training their units received. Eighty-five percent of the leadership in Figure 11 received sufficient training materials, while 69 percent of the operators and maintainers identified receiving sufficient training materials to operate the systems in their units.

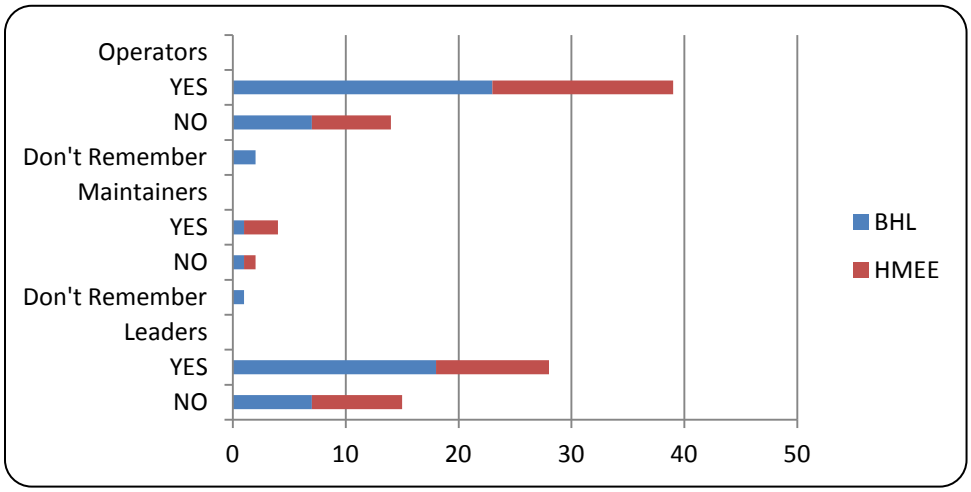


Figure 11. Question 13: Did You Receive Training Manuals on the System?

In Figure 12, operators were asked if they had access to manuals that covered PMCS and operator level maintenance tasks. Between 8 percent and 9 percent of the operators responded they had access to PMCS manuals, and 75 percent said they had access to manuals that listed operator maintenance tasks.

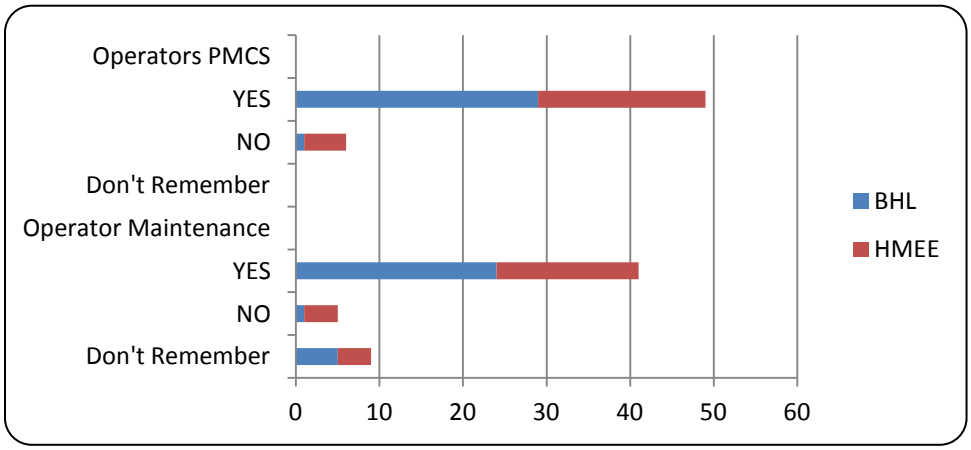


Figure 12. Operator Questions 14 and 15: Did You Have Access to Manuals that Covered PMCS and Operator Maintenance?

Figure 13 identifies availability of repair manuals at the unit level. Responses where all manuals were located at the CLS vendor were aggregated with the "YES" responses. Seventy-four percent of the leaders responding identified sufficient maintenance and parts manuals at either the unit or with the unit CLS, while only 43 percent of the mechanics responded that sufficient manuals were available at their locations.

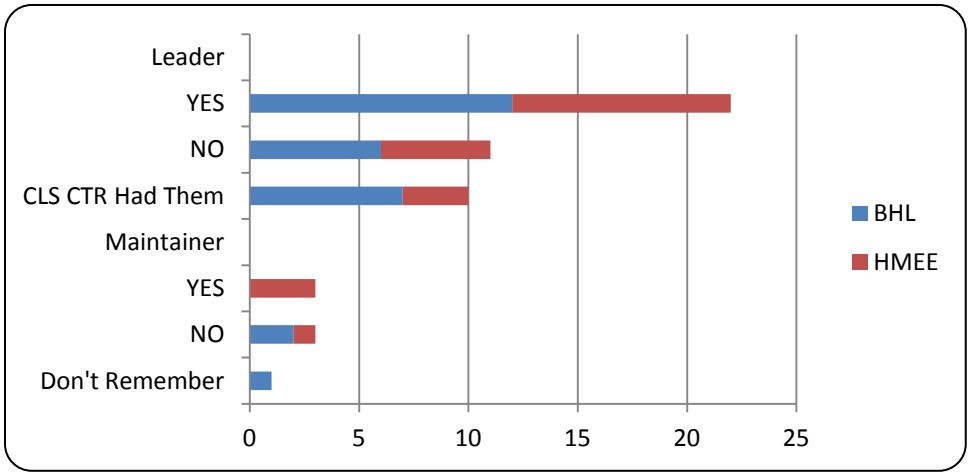


Figure 13. Leader Question 15 and Maintainer Question 14: Did You Have Access to Sufficient Maintenance and Parts Manuals?

The final question on training was asked of unit leadership to inquire if CLS-provided training was sufficient and met unit needs. No training was aggregated with the "NO" response, identifying less than a 50 percent overall approval of the CLS training provided to the units. The percentages when analyzed between BHL and HMEE were 48 percent and 50 percent respectively, shown in Figure 14.

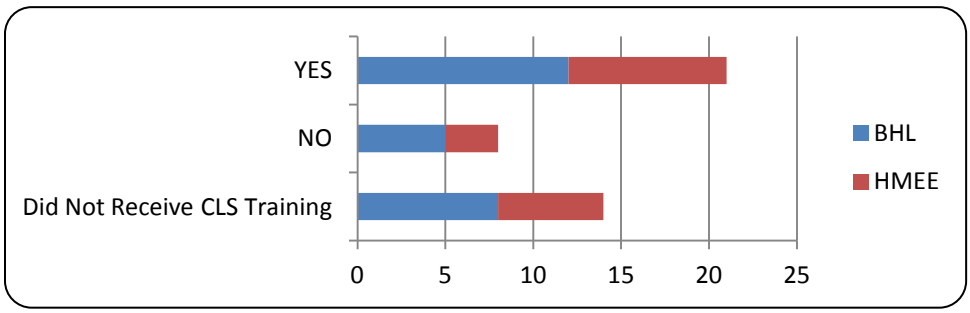


Figure 14. Leader Question 16: Did CLS Training at Unit Level Meet Needs?

CLS Involvement

The survey responses in this section were designed to target how well CLS worked for the unit and to generate some statistical inference relating to CLS workload, system availability and to subjectively compare CLS to traditional organic unit maintenance. Both the operator and maintainer were given the ability to opt out of answering questions in this section if they either had no mechanical problems with the BHL or HMEE systems or if they were not authorized to work on the system if it had mechanical problems. Table 7 lists the six operator, seven maintainer and five leader responses solicited from the participants.

Table 7. CLS Repair-Related Questions

Operator		
*	16	Did you experience any equipment problems requiring CLS? If no go to 21
	17	Approximately how many times did your system need CLS?
	18	Approximately how many months were CLS available?
	19	Approximately how many of these problems were warranty related?
	20	Approximately how long was your system non-operational under CLS?
	21	Compare CLS to your traditional unit maintenance.
Maintainer		
	15	As a unit mechanic were you authorized to repair or service the system?
	16	Did you repair any problems that should have been repaired by CLS?
	17	If Yes, how many repairs did you make a repair?
	18	Approximately how many months were CLS available?
	19	Approximately how many of these problems were warranty related?
	20	Approximately how long was your system non-operational under CLS?
	22	Compare CLS to your traditional unit maintenance.
Leader		
	17	Did the CLS contractor meet unit needs for system repair?
	18	Did the CLS contractor meet unit needs for system services?
	19	Compare your unit's organic maintenance to CLS.
	20	Approximately how long was your system non-operational under CLS?
	21	Were any issues experienced causing excessive down time?

Operators were asked if their systems required the use of CLS to make repairs and, if so, approximately how many times the system was not available for use because of repairs. These responses are reflected in Figure 15.

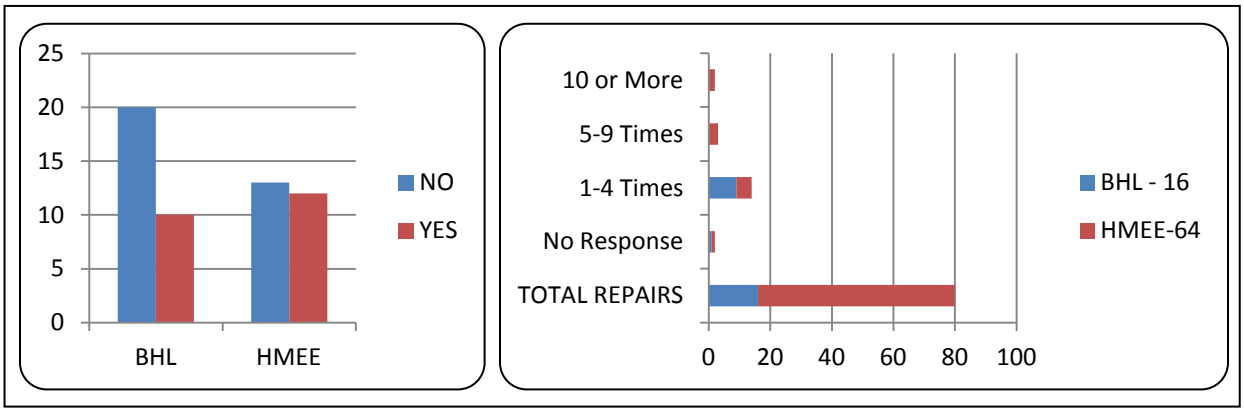


Figure 15. Operator Questions 16 and 17: Did Your System Require CLS and, if so, Approximately How Many Times Since You Received It?

Maintainer responses for questions 15, 16, and 17 were limited to seven, of which three were for the BHL and four were from HMEE maintainers. Only one maintainer was allowed to make repairs on the HMEE system, and this was in a deployed posture. This mechanic reported the system required CLS maintenance in five instances. He said he was responsible for completing two of the repairs that should have been completed by the CLS vendor.

Leaders were asked if CLS met unit needs in the areas of system repairs and periodic services. Figure 16 reflects leader responses.

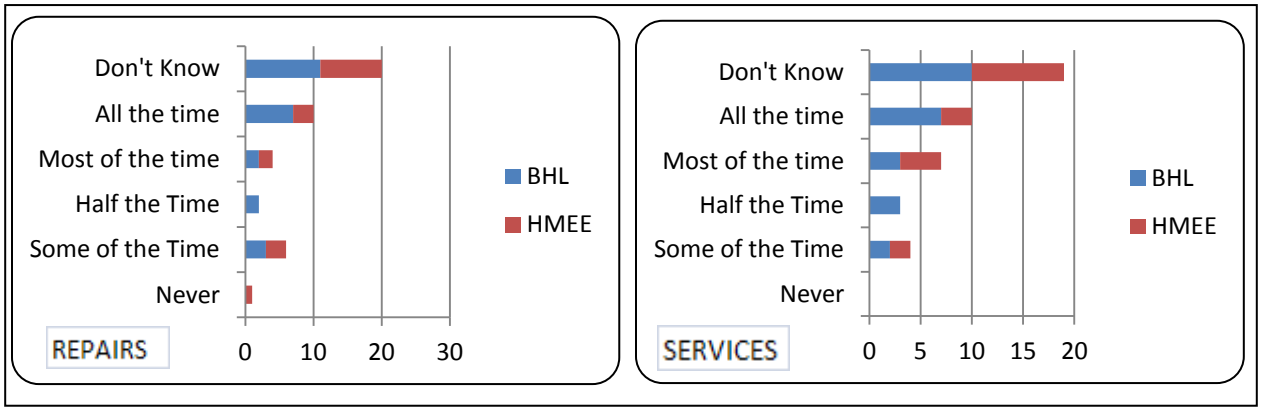


Figure 16. Leader Questions 17 and 18: Did CLS Meet Unit Needs for Repairs and Services?

Operators and maintainers were asked how long CLS was available in their units to support the BHL or HMEE. Responses were in months and the separated into categories of more than 12 months, 7 to 12 months and 1 to 6 months. There were three respondents who failed to provide a numerical response. Only one maintainer responded to this question, and his unit had the HMEE for 2 months. Data are displayed in Figure 17.

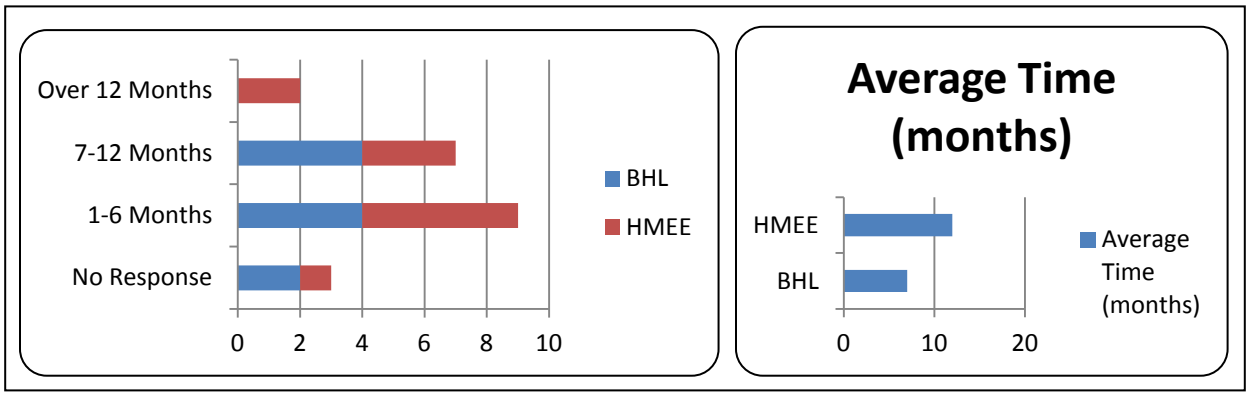


Figure 17. Operator/Maintainer Question 18: How Long Did CLS Exist in Your Unit at the Time of this Survey?

Both operator and maintainer were asked to identify how many system repairs were warranty-related. Responses from the 22 participants who reported system repairs in Figure 15 identified the repairs as 56 percent (nine repairs) warranty-related for the BHL and as 57 percent (39 repairs) warranty-related for the BHL. Figure 18 displays warranty-related repairs.

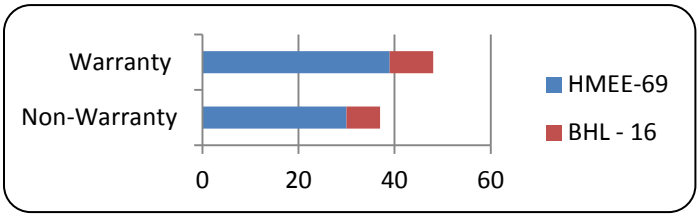


Figure 18. Operator/Maintainer Question 19: How Many Repairs Were Warranty Related?

The operators and maintainers who responded "YES" to Question 16 on their surveys were asked approximately how long their systems were nonoperational under CLS in hours—or, if the system was nonoperational more than a day, for how many days it was nonoperational. The

leaders who had nonoperational systems also were asked to estimate approximately how many days their unit systems were nonoperational. There were 18 of 22 operators, no maintainers, and 23 of 43 leaders who responded with nonoperational times for the systems in their units. Figure 19 displays the responses both as time by system type and time as submitted by survey instrument (participant type).

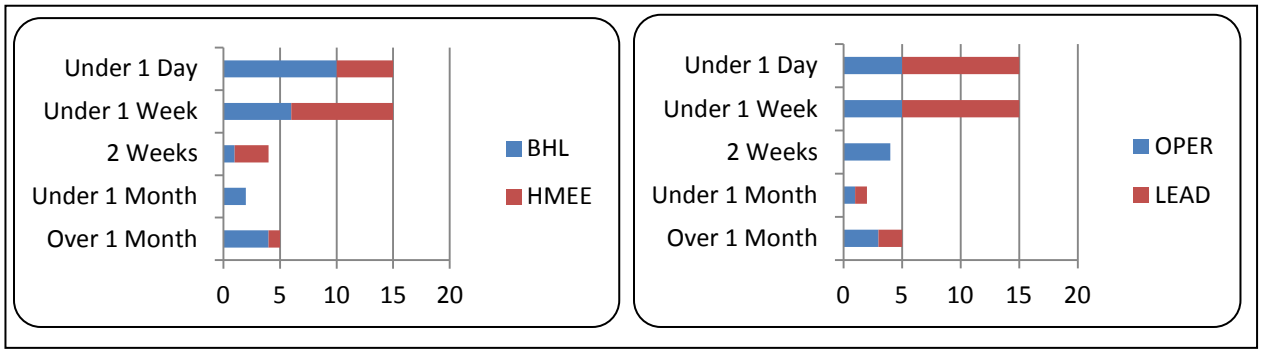


Figure 19. Operator/Maintainer/Leader Question 20: Nonoperational Time

All participants were asked to compare their organic maintenance capability to that of the CLS maintenance. This was presented as a five-point Lykert scale response with an opportunity for the participant to opt out with an "I don't know" response. Figure 20 displays the responses by system type and also by survey instrument (participant type).

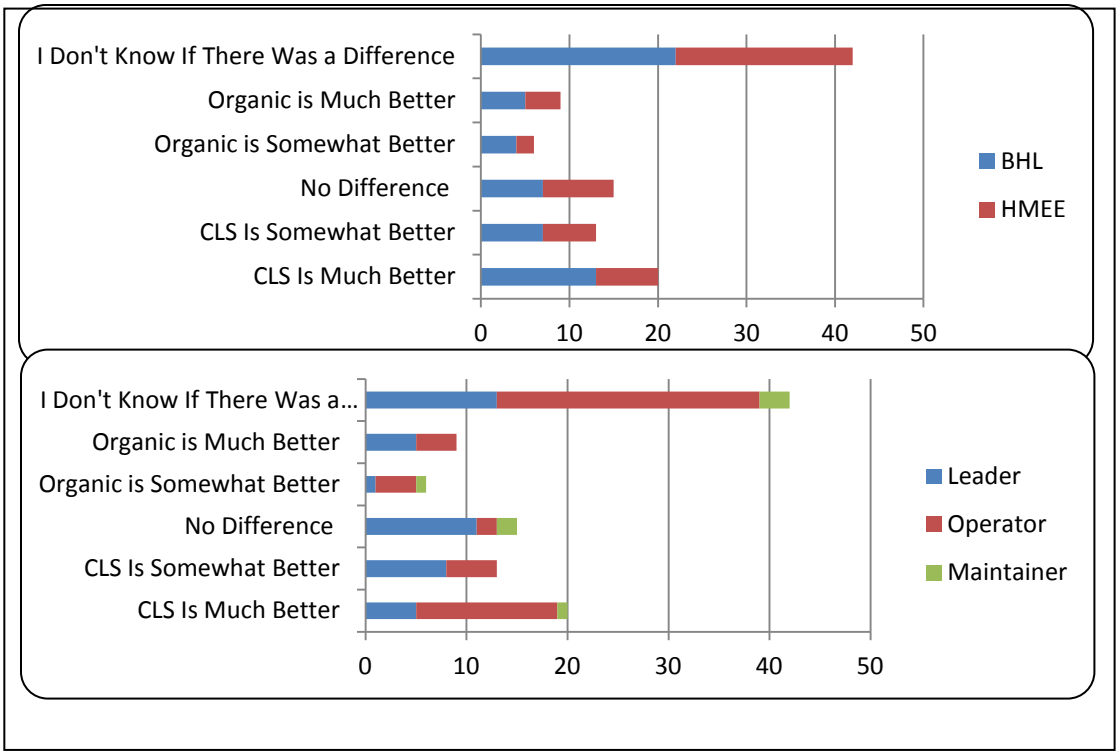


Figure 20. Operator/Maintainer/Leader Question: Compare CLS Proficiency to That of Your Units Organic Operational Maintenance

The last question for this section was solicited from the leaders and was in essay format asking leadership if they experienced any issues with their systems that appeared to cause excessive non-operational time. For the BHL, there were eight leader respondents, and their comments follow in bullet format (Note: Responses transferred verbatim from surveys):

- Seemed like we always had bad batteries.
- BATTERIES and some Warranty BS!!!!
- While deployed, Case Contractors attempted to maintain our equipment. Over time, our maintenance section was trained or worked with Case to resolve the issue.
- New rim for front tire, the front rims seem to have a problem with bending easily, both Stateside and in-theater.
- The batteries caught on fire and when they were replaced, it took about 8 weeks to fix the charging issue. The BHL turned into a thing to sweep around in the motorpool and not a piece that I could use on a project site.
- Beads of the tires were continently busting, which resulted in having to have a rep come fix the tire.

- My battalion had 3 BHLs, and there were never more than 2 operational at the same time, because they kept breaking down. Sometimes all 3 of them would be broken simultaneously. The only positive thing about them was they were still under warranty.
- The hydraulic lift cylinder. The front bucket gets stuck when left down for a short period of time.

For the HMEE, seven leaders responded with comments. Their responses follow in bullet format:

- When the temperature is below freezing, the brakes are near impossible to release. We have tried everything (leave brakes disengaged after shut off to cool, clear debris etc.
- Drive shaft broke, it gets stuck easily.
- Delay in mission.
- The metal grate on the underbelly that "protects" the hydraulic master pump was crushed and had to almost be blowtorched out.
- Hydraulic Line Leaks.
- HMEE not getting fix for simple stuff
- We have three HMEEs that are deadlined and cannot be worked on because the equipment is under warranty. The equipment has to sit on line until a rep comes down.

Deployment, Operations, Overall Comments

The remaining questions in the survey instruments are grouped under operations and conclude with an opportunity for the participant to provide overall comments and how CLS worked in their units. Table 8 identifies the three operator, three maintainer, and five leader questions that close out the survey instruments. Their data follow after the table.

Table 8. Operational and Comment Questions

Operator		
	22	**Have you operated the HMEE or BHL while deployed?**
	23	**Did CLS negatively impact your unit's mission?**
	24	**Please provide comments on CLS or unit maintenance.**
Maintainer		
	21	**Have you operated or repaired the HMEE or BHL while deployed?**
	23	**Did CLS negatively impact your unit's mission?**
	24	**Please provide comments on CLS or unit maintenance.**
Leader		
	22	**Did CLS negatively impact your unit's mission?**
	23	**Did your unit operators/maintainers operate/repair the system while deployed?**
	24	**Were unit recovery operations with the CLS vendor and your unit a team effort?**
	25	**Did the CLS vendor have any negative impact on your admin/tactical footprint?**
	26	**Please comment on CLS or its effects on your unit.**

For analysis, the responses identifying deployment for operator, maintainer and leader have been aggregated (Questions Operator 22, Maintainer 21, and Leader 24). The same action also was taken for mission impact (Questions Operator 23, Maintainer 23, and Leader 22). The responses are displayed by system and by survey instrument (participant type). The percentage identified in Figure 21 is the percentage of the responding population by survey instrument that stated "YES".

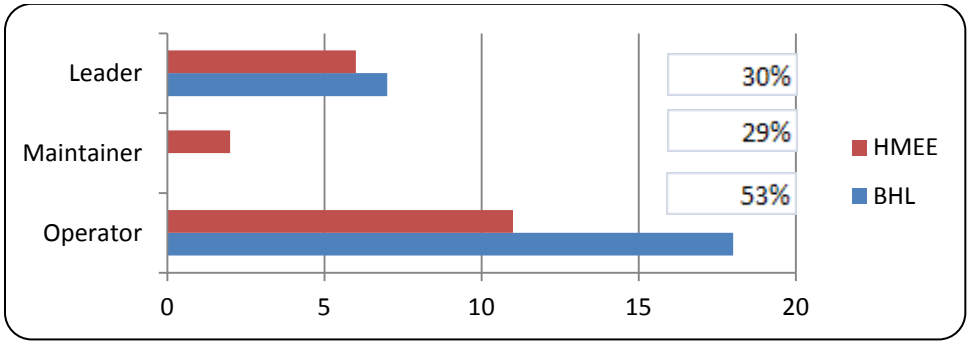


Figure 21. Operator/Maintainer/Leader Question: Did You or Your Unit Use the System While Deployed?

The percentages listed in Figure 22 represent a "YES" responses by survey instrument population, indicating the co-location of CLS negatively affected the unit mission. When analyzed by BHL respondents and HMEE respondents, the percentages are 16 percent and 17 percent respectively, and, out of the population as a whole, 17 respondents had problems with CLS negatively affecting their mission (16 percent).

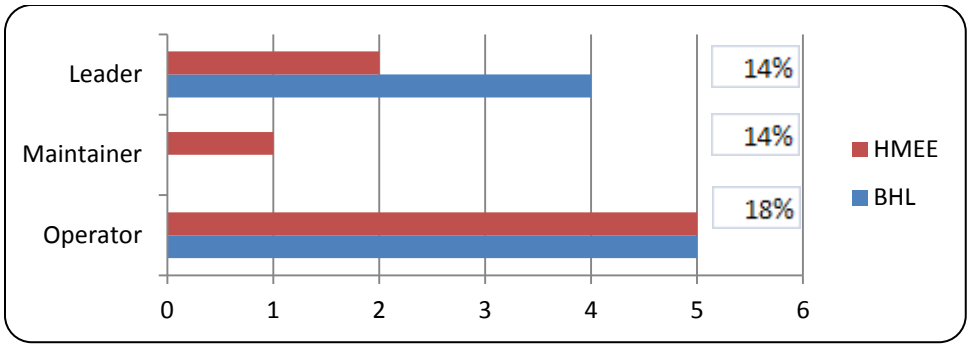


Figure 22. Operator/Maintainer/Leader Question: Did CLS Negatively Affect Your Units Mission?

Of the 43 leaders responding to leader Question 24, there were 12 responses (seven BHL and five HMEE) that their units participated in recovery operations and had a good "one team" relationship with the CLS vendor team (28 percent for both BHL and HMEE, resulting in a 28 percent overall).

When leaders were asked if the CLS vendor operations had a negative impact on their Unit's tactical footprint, seven leaders (four BHL and three HMEE) stated it did (16 percent of the total leader population).

The last question on each survey instrument was an essay type response asking for comments on CLS. The responses are captured below in the respective operator, maintainer, and leader groups. (Note: Responses transferred verbatim from surveys):

OPERATOR (Question 24): BHL, 10 comments

- Needs more cab room. Even though the seat is adjustable, it is still pretty tight with gear on. Also we had a lot of problems in Afghanistan trying to dig in the rough terrain. We end up having to get the groundbreaking attachment, so what I am getting at is it would be nice to have more power.
- It would be nice to get more unit level training on the BHL and HMEE. We have had other companies that when fielding equipment give unit/battalion training and would be nice to have more annual training like that to keep up with the equip. and to make sure new Soldiers get the best training on the new equipment.
- You need to upgrade the tires on the BHL. The front tires on the BHL always pop off the rim. I think if you had a locking wheel, so they don't pop off when you turn. It would help complete [our] missions faster; instead we have to go slow to make sure the wheel doesn't pop off. Thank you for all of your help.
- I think all unit maintenance should receive a block of instruction from CLS and case should send out more surveys to guys who use the BHL on a regular basis so we can tell you the good and the bad.
- The BHL is handy in many situations, however very underpowered drive train, and small stance gives it an awkwardness moving about difficult terrain. The cab has many visually impaired areas that are not worth the cab's weight in metal. A civilian cab would be preferred over a fake-up armored version.
- I personally have never seen a CLS person work on our equipment. When we need something done, we most likely always handle it ourselves or it is taken care of by maintenance.
- CLS needs to be more available during deployment. A lot more work would have got done if so.
- We blew a front tire in Afghanistan and we were unable to replace it for a little over a month while at Forward Operating Base (FOB) Sharana. Needless to say it was quite a letdown. The BHL did prove to be quite useful when it was operational because of its maneuverability.

- After receiving BHL's, all were deadlined within a month. Civilians told us they were probably sitting in a yard for a while. Dead batteries are a common problem. Need a way to carry around spare tires.
- While deployed I was a HMEE operator in 562nd EN Co., 5th Brigade, 2nd I.D. and the CLS was probably the worst that I have ever experienced. I believe that he was subsequently fired. But the fact that our unit maintenance could not work on it is crap. That is setting everyone affected by this equipment up for failure.

OPERATOR (Question 24): HMEE, 7 comments

- If you build another one, make sure the hyd. connectors and the fitting aren't fragile. Make everything bulletproof and it might stand up to the military operators.
- We had a lot of issues with the HMEE electrical system especially the Park Brake. It's garbage, but when we had a CLS in our FOB the problem was fixed immediately, but when he wasn't there we had to send the HMEE away and we wouldn't see it for months and also our unit maintenance didn't know anything about the HMEE, which was kind of annoying.
- System needs more power and better arm/ bucket design, and a bigger bucket.
- The HMEE that we received had constant hydraulic leaks and for some reason even after being fixed would develop the leak again after only a day or two of heavy use. I don't know what CLS did to "correct the problem," but whatever it was didn't work.
- CLS is too far away. Unit should be able to work on equipment. Warranty hampers reparability when you have to wait for CLS. We are just lucky that it winter and Operational tempo is slow.
- The HMEE was an overdesigned failure, too much electrical issues, and the metal is cheaply made, hydraulic tool work great but the hyd pump is unreliable in pressure. Overall, I have been operating army equipment for 12 years as a construction equipment operator and I am very disappointed in this overpriced equipment. Whoever is designing this equipment needs to get fired!
- I feel the HMEE is a good piece of equipment but hard to maintain due to the fact that you have to wait on CLS to get the equipment up and running. If we empower our army units to work on this piece of equipment, it will better help the units in garrison and down range. For example, unit level team looks at equipment and supplies the CLS [with]

what's wrong, so parts and issues can better be tracked and fixed in a timely manner. At least this will help units fix small things so missions are not hindered due to CLS not being in the area. Also CLS is not going to be at every training field problem you have. So once again this will also help when equipment breaks down at 0200, the unit can at least find the problem or fix it and update the CLS on what happened and what went wrong. Another problem is that the attachments are Stanley (i.e. jack hammer) and now you have two people who need to be called when things break down. The Army needs to build a better system or find another piece that's more friendly.

MAINTAINER (Question 24): BHL, 2 comments

- Maintenance work orders for the CASR BHL are conducted by a civilian contractor.
- The BHLs we currently have in unit (3 each) only came with 10-level or operator manuals. There are no maintenance (20/30) level or parts manuals available on LOGSA or LIW to order much-needed parts, both service and repair parts. Operators in unit have damaged the bucket blade and lost bolts in the clamshell as well as broken the teeth. Will have to evac. equipment to higher maintenance for these deadline repairs. Any further assistance on warranty or service actions is much appreciated. Would like any manuals for this equipment if available.

MAINTAINER (Question 24): HMEE, 2 comments

- I had to replace the trans in the HMEE, and the CLS left in the middle of the job, and it took a few months to get someone out to the FOB to reprogram the computer. Plus, I was left to finish on my own.
- It would be nice to have the ability to receive parts and repair them in the field vs. having to transport the piece of equipment half way across the country for repairs. I think this may have caused some delay in getting the system operational.

LEADER (Question 26): BHL, 9 comments

- What little support that we have needed, has been very professional, and customer-oriented. The Case BHL is a nice system, far better than the piece of junk SEE. This is coming from a guy who's worked for Caterpillar for 17 yrs. Have a great day!
- A job well done by CLS. Glad to have them visit the unit.
- The instructor provided great training to my Soldiers. Thank you very much for your help.

- The CLS was good to have the problem was getting them to our locations to fix the equipment that our operators were not able to fix due to warranty obligations.
- CLS was a strong asset.
- In-theater, the contractors were very proactive, they ensured our equipment got fixed fast and effectively. Here, Stateside, we have to stay on top of them or nothing seems to happen.
- I don't know that CLS was detrimental to my platoon's operation, because my company's and battalion's mechanics never had the opportunity to maintain the BHLs, so I can't compare and say that CLS repairs were substandard and the reason for the BHLs to continually break down. I suspect that the Case BHL is just a poorly designed acquisition for the Army. I would have gone with John Deere. The Case was a nice size for trenching, but most of the time I had to use my Deere 230LCM excavator, with its way too large bucket, because all the Case BHLs were in the shop.
- When there was an opportunity for our unit level team to fix it so we could get back to work, we couldn't due to warranty and contract issues. … Just kind of hamstrung us in theater.
- I believe Case needs to train all Maintenance Officers, NCOs, personnel, etc. I feel units will be better prepared once maintenance sections are fully trained on operation, maintenance, and training requirements. While deployed, Case contractors attempted to deadline CASE BHL's that were working on job sites. If those vehicles belong to the Army, it is the unit's discretion whether or not to deadline a vehicle. Training from CASE needs to be immediate when Units receive the equipment. After training is received, the need for CASE contractor support should be minimal.

LEADER (Question 26): HMEE, 3 comments

- I know that these issues are known to everyone already, but if something could be done about this, it would be helpful. I think our mechanics should be capable to order parts and install them no matter what. We should always be self-sufficient in garrison or when deployed.
- Please note that I only supervised/operated the HMEE while deployed to Iraq in 2009.
- Biggest complaint was the HMEE did not have enough power compared to a CAT 5yd bucket loader.

Overall comments were provided by 31 percent of the survey participants. Thirty-six percent of the BHL participants provided comments, while only 26 percent of the HMEE participants provided comments. When analyzed by survey instrument, 31 percent of the operators, 57 percent of the maintainers, and 28 percent of the leaders provided comments to the last survey question.

CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

Population and Sample Size

Conclusion: The survey instruments were distributed via AKO e-mail to an estimated 4,000 potential operator, maintainer, and leader participants responsible for the operation of 433 BHL and 269 HMEE systems. Responses after 55 days of solicitation totaled 105 complete surveys from 103 unique participants. Analyzing the survey participants against the projected e-mail list provided by AKO e-mail group sorting using UICs and MOS, participation was 2.6 percent of the possible e-mail population. When compared to the list of systems and UICs, the sample size or participants is 14.6 present when one respondent per system is calculated but in reality if all systems have at least one operator, one maintainer, and one supervisor, then the response ratio falls to 4.9 percent. Responses were sufficient to provide data and establish a baseline for this report, but the confidence level of some responses are considered low and may not accurately reflect the responses for the full population. As the researcher, I did not have access to the AKO programmers that coded the RBG queries to populate the MOS groups by UIC. A number of the MOS RBG queries (MOS 12E, 12J, 120A, 123A, 915A, and 919A) did not return e-mail contacts for numerous potential participants so these MOSs are not represented in the data sets collected. I was unable to do follow-up with possible participants unless they completed a survey. The ability to validate the data provided was limited by the time of report submission and the accuracy of the e-mail address or unit contact provided by the participant in the demographics section of the survey.

Recommendations: Future research in this area using the BHL, HMEE, or any other COTS system currently using CLS will require command involvement or some type of incentive to insure better participation from unit operators, maintainers, and leaders. The survey instrument was simple, yet some participants failed to complete the second page of the survey. The survey was not time-consuming, averaging under 5 minutes to complete, and only required answers to 10 of the 24 or 25 questions, thus allowing the ability to opt out if the response was not known or the participant did not want to provide an answer. Yet less than 2.6 percent of those solicited responded with usable data.

Demographics

Conclusion: The survey instruments initially were designed to address the engineer operators and leaders in the 21-series MOS. The Soldiers in the 21-series MOS have recently been reslotted in positions in the 12-series MOS. The data reflect the change to 12-series, but it is not clear if all components (Active, USAR, or ARNG) have completed the transition to the 21-series MOS. The AKO help desk ran the RBG queries against both the 12- and 21-series MOSs and they are reflected in the 3,924 individuals contacted via e-mail. The maintainer surveys were targeted for the 91-series MOS, and lists for 91B and 91L were received from the AKO RBG process. Participants solicited from the 91-series MOS queries resulted in only one 91X and five 91L responses. There were no survey responses from unit Warrant Officers from either the engineer or maintenance MOSs. And Officer Leadership only replied with four surveys.

Participant rank distribution was as projected for the leader survey, with the majority (65 percent) of the responses received from team and squad positions. These positions would have the firsthand insight as to whether CLS was working for the BHL or HMEE systems for they are the first-level supervisors on the job site. The operator survey, on the other hand, was returned by what appear to be both operators (49 percent) and supervisors (51 percent). Although most supervisors started out as operators and were qualified to respond to the operator survey, all but two failed to provide supervisor input using the leader survey instrument.

Participant experience had good distribution for all experience categories, as projected, for both the BHL and HMEE systems were fielded at different times to the participants' parent units or to individual unit UICs.

Recommendations: As recommended under sample size, require command involvement or some type of incentive to ensure better participation from unit operators, maintainers, and leaders as a way to support more robust participation. Also additional involvement from the respective programs offices and the user community. In this case, the Maneuver Support Center of Excellence (MSCoE), could contact unit leadership to entice unit participation. If possible, also target the contractor participants in the vendor CLS program to provider survey responses to the maintenance survey instrument with a section for additional contractor comments to either support or not support CLS for the life cycle of the system.

Training and Manuals

Conclusion: Of the 62 operators and maintainers, eight participants (three BHL and five HMEE)—or 13 percent of the Soldiers—did not receive training on the BHL or HMEE systems. The unit leaders who did respond to the unit training question responded with a 92 percent favorable rating that their Soldiers were proficiently trained to operate the unit's assigned systems.

Approximately 9 out of 10 operators identified as having access to PMCS manuals for their assigned systems but only 3 in 7 maintainers reported having access to the manuals needed to execute system repairs or services.

The results for training and manual support for systems with CLS reflects approximately 90 percent overall proficiency (87 percent trained, 92 percent leader satisfaction, and 90 percent have manuals).

Recommendations: Units should attempt to train 100 percent of their work forces. In the case of the BHL and HMEE systems, both systems are acquisition programs of record and, upon issue, all operators should be trained by the program office using some variant of NET.

All systems should have operator level manuals. The BHL and HMEE were issued as new equipment to the assigned units. The program office should ensure that the manuals, along with training in their use, are an integral part of the fielding process. On the unit readiness side, mechanics with no access to maintenance manuals constitute an overall unit shortfall that leads to extended system down time. This can lead to mission failure, especially when the CLS element is not colocated on the FOB (or on the job site) during deployment (or training exercises).

CLS Involvement and Repair Activity

Conclusion: Of the operators responding to requiring CLS to repair their system, 33 percent of the BHL and 48 percent of the HMEE operators identified needing CLS to make system repairs. Eighty total repairs (16 BHL and 64 HMEE) were identified by the survey respondents, and all were repaired by the CLS. As a whole, all repairs were to be made by the assigned CLS team and only one HMEE mechanic responded as actually working on a HMEE system while deployed. This would be in accordance with the provisions of the CLS contract.

When leaders were asked about CLS support repairs and services, 44 percent of the BHL and 50 percent of the HMEE respondents did not know how well CLS repairs were doing in their

unit. When asked about services, it was the same for HMEE but dropped to 40 percent for the BHL. Of those who responded and rated CLS in their unit, BHL supervisors stated CLS met expectations only 64 present of the time for repairs and 67 percent of the time for services. HMEE supervisors stated CLS met expectations 66 present of the time for repairs and 78 percent of the time for services. Repair under CLS had a negative effect on the unit's operational readiness rate. Comments on the BHL focused on three major areas: battery failure, tire and rim failure, and reports of problems with the front bucket hydraulic cylinder. Comments on the HMEE did not identify a repair problem pattern but did identify an instance of brake lock-up, broken drive shaft, and hydraulic leaks.

Warranty work accounted for approximately 56 percent of the work performed by the CLS in both systems (9 of 16 repairs reported on the BHL system and 39 of the 69 repairs reported on the HMEE system). Note: These are subjective data collected from operators and could bias data that may be available from mechanical diagnostics records or vendor logs. The BHL system is produced by a commercial manufacturer on a commercial assembly line and is similar to the commercial variant produced by the vendor for used by commercial contractors. The HMEE is assembled on a commercial assembly line but consists of NDI components from a number of the manufacturer's commercial agricultural and excavating systems. The higher number of warranty-related problems (39 for HMEE vs. 9 for BHL) is attributed to the lack of a commercial HMEE fleet to support trouble-shooting and system maturity of the product line. Leaders commented numerous times on problems with both systems being nonoperational due to warranty-type problems.

All participants were asked to compare CLS performance to unit maintenance performance for repairs and services. Forty percent of the participants opted to answer, "I don't know if there was a difference." Of the remaining 60 percent, 14 percent said there was no difference, 14 percent said organic was better, but the remaining 32 percent said CLS was better than the maintenance provided by the unit.

All participants were asked to identify how long it took for the systems that needed repair to return to operational status. Thirty-seven percent stated repairs took less than a day, 37 percent stated the repairs were completed in a week, and the remaining 26 percent said repairs took more than a week, with five of the repairs (four BHL and one HMEE) reported to take more than a month to complete. If the unit maintenance was trained to repair the systems and the unit's parts

capability was stocked using system demands, repairs would be expedited and nonoperational time reduced.

Recommendations: In a deployed or unit training exercise environment, the unit mechanics should be trained to make nonwarranty repairs to the system in the absence of colocated CLS assets.

Leader satisfaction for overall CLS performance in repairs must be improved. BHL problem areas such as tire and battery failure must be corrected. If they cannot be resolved in the short term, additional parts must be staged at the operational sites until the redesign or part upgrade can be made.

Warranty problems must be minimized and nonoperational time from warranty repairs reduced. If the sample-size data reflect population, 56 percent of the repairs are warranty-related on nonoperational time.

Although CLS performance was rated above unit maintenance by more than 50 percent of the participants rating CLS to unit maintenance, 63 percent of the repairs took 2 days or more to repair. Of that total, 19 percent of the respondents stated it took more than a month for repairs to be made to their systems. More than 2 days may be acceptable for USAR or ARNG units in a multiple units training activity such as a drill weekend, but for those units mobilized or in an annual training status, systems down more than 2 duty days under CLS is unacceptable. The CLS contractor must state the vendor will stock parts for anticipated repairs and provide services within 24 hours if the CLS team is not colocated with the systems unit.

Unit Operations and Deployment

Conclusion: More than 42 percent of the participants indicated they had operated or supervised the operation of the BHL or HMEE systems while deployed, validating the data points concerning system usage and repair knowledge in an operational environment. Sixteen percent had experienced negative effects on their unit's mission. CLS impact to the mission must be reduced and, if possible, eliminated.

Only 28 percent of the leadership responded favorably to a good working relationship between the unit and CLS maintenance teams. In a deployed status, this rating is unacceptable.

Recommendations: The contracting officer or contracting officer's representative (COR) must play an active role and interface with the unit leadership and the CLS team to ensure neither unit mission nor operational readiness is degraded by use of CLS maintenance. The CLS

should be in contact with the unit maintenance leadership to coordinate recovery, repair operations, and tactical interface with CLS and the supported unit.

Miscellaneous Data Points and Comments

Conclusion: Thirty-two percent of the participants provided closing comments to their specific survey instruments. Comment responses are captured in Chapter 4, starting on pp. 4-17. Comments when broken down into categories addressed parts, performance, training, human factors engineering (HFE), and the CLS contract/warranty. Most comments on CLS from a personal perspective were positive, addressing CLS as a positive asset when colocated with the unit. Warranty issues were highlighted four times in most cases in the absence of the CLS team where the unit mechanic could have made the repair in the absence of the CLS team was prevented from doing so by the warranty obligations. Parts and the lack thereof were identified numerous times in the case of BHL batteries and tires/rims and a HMEE transmission. Performance was negatively addressed in the BHL for bucket power and the HMEE for overall hydraulic power and electrical shortfalls in the braking system. Training was commented on by operators, maintainers, and leaders, who said more was required and should be offered annually as refresher courses. HFE was noted on BHL cab size (lack of storage for mission gear) and lack of visibility in the systems fitted with the armored CPK.

Recommendations: Warranty repairs need to be identified as soon as possible and parts staged for both the known repairs and for systems that can anticipate those repairs in the short term. The COR needs to be proactive and interface with the CLS team and unit leadership to identify if any warranty repairs can be made by unit maintenance in the absence of the CLS team if the deficiency is noted by previous units and the parts can be made available to the unit maintenance team (this also will cover the BHL tires, rims, and batteries covered in the maintenance comments section). Customer representation from the unit and MSCoE should address the power and electrical issues with the program office, and, if necessary, the vendor, and make adjustments where possible. The unit should work with the program office and the MSCoE or the Sustainment Center of Excellence (SCoE) to ensure current and requested annual training for operators and maintainers is funded and scheduled. Customer representation from the unit and MSCoE should address the visibility and crew compartment/CPK issues and make adjustments where possible.

Overall Analysis of Hypothesis Based on Data

1. Organic maintenance support is required for full life cycle sustainment of COTS/NDI systems.
2. CLS can sustain a COTS/NDI system throughout the systems full life cycle.

Conclusion: Based on the data provided by the participants, CLS has its advantages in the area of warranty work, for the presence of a vendor representation cuts the initial diagnostic time and identification of a vendor required repair. Even with vendor present on-site through CLS, numerous repairs could not be completed quicker than if the unit was authorized to use its organic maintenance assets and organically stocked parts. The data indicate warranty repairs and CLS contract requirements extend nonoperational time of COTS items, particularly when a unit deploys with the systems and is in a tactical environment. CLS can support COTS systems for the estimated life cycle, but total LCC to contract the CLS team would be an added annual cost and an increase to the unit's logistical footprint when in a tactical environment. Once the unit's organic assets are trained, and the repair parts and services items are provisioned into the unit's parts inventory, organic maintenance support would be required to reach the lowest system LCC and maintain the system at its optimum operational readiness.

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GLOSSARY OF ACRONYMS AND TERMS

AIT	Advanced Individual Training
AKO	Army Knowledge On-line
AR	Army Regulation
ARNG	Army National Guard
BCA	Business Case Analysis
BHL	Backhoe Loader
BSA	Brigade Support Area
CARC	Chemical Agent Resistant Coating
CASE	J.I. Case
CFLCC	Coalition Forces Land Component Command
CLS	Commercial Logistical Support
COR	Contracting Officers Representative
COTS	Commercial Off-the-Shelf
CPD	Capabilities Production Document
CPK	Crew Protection Kit
DAU	Defense Acquisition University
DCMA	Defense Contract Management Agency
DLA	Defense Logistics Agency
DLAD	Defense Logistics Agency Directive
DoD	Department of Defense
DoDI	Department of Defense Instruction
FAR	Federal Acquisition Regulation
FLMNET	Field Level Maintenance New Equipment Training
FMR	Full Materiel Release
FOB	Forward Operating Base
FUE	First Unit Equipped
FY	Fiscal Year
HFE	Human Factors Engineering
HMEE	High Mobility Engineer Excavator

IED	Improvised Explosive Device
JCB	J.C. Bamford
JP	Jet Propellant
LCC	Life Cycle Cost
LD	Logistics Demonstration
LOG	Logistics
MAC	Maintenance Allocation Chart
MOS	Military Occupational Specialty
MOU	Memorandum of Understanding
MSCoE	Maneuver Support Center of Excellence
NATO	North Atlantic Treaty Organization
NET	New Equipment Training
NDI	Non-Development Item
ONS	Operational Needs Statement
OJT	On-the-Job Training
ORD	Operational Requirement Document
PBL	Performance Based Logistics
PM	Program Manager
PMCS	Preventative Maintenance Checks and Services
PMO	Program Management Office
RBG	Rule Based Groups (AKO sorting code)
REF	Rapid Equipping the Force
RI	Rapid Initiative
SBCT	STRYKER Brigade Combat Team
SCoE	Sustainment Center of Excellence
SD	Supporting Document
SEE	Small Engineer Excavator
SME	Subject Matter Expert
SOCOM	Special Operations Command
SSP	System Support Package
TM	Technical Manual

TMDE	Test, Measurement, and Diagnostic Equipment
UIC	Unit Identification Code
USAR	United States Army Reserve
USAES	United States Army Engineer School

APPENDIX A
SURVEY INSTRUMENT

OPERATOR

DEMOGRAPHICS

Please provide the information requested. Those questions with an asterisk are needed for data computation. Your name will be removed once the data is input to the main data base.

***1. LAST NAME, First Name**

2. E-Mail Address

***3. RANK**

- PVT to SPC
- SGT to SSG
- SFC
- MSG or 1SG
- LT
- CPT
- WO or CW

Other (please specify)

***4. Primary MOS**

- 21B
- 21E
- 21J
- 21V
- 21H
- 21N
- 91B
- 91L
- 91X
- 120A
- 915A
- 919A
- Officer (21)
- Officer (91)

Other (please specify)

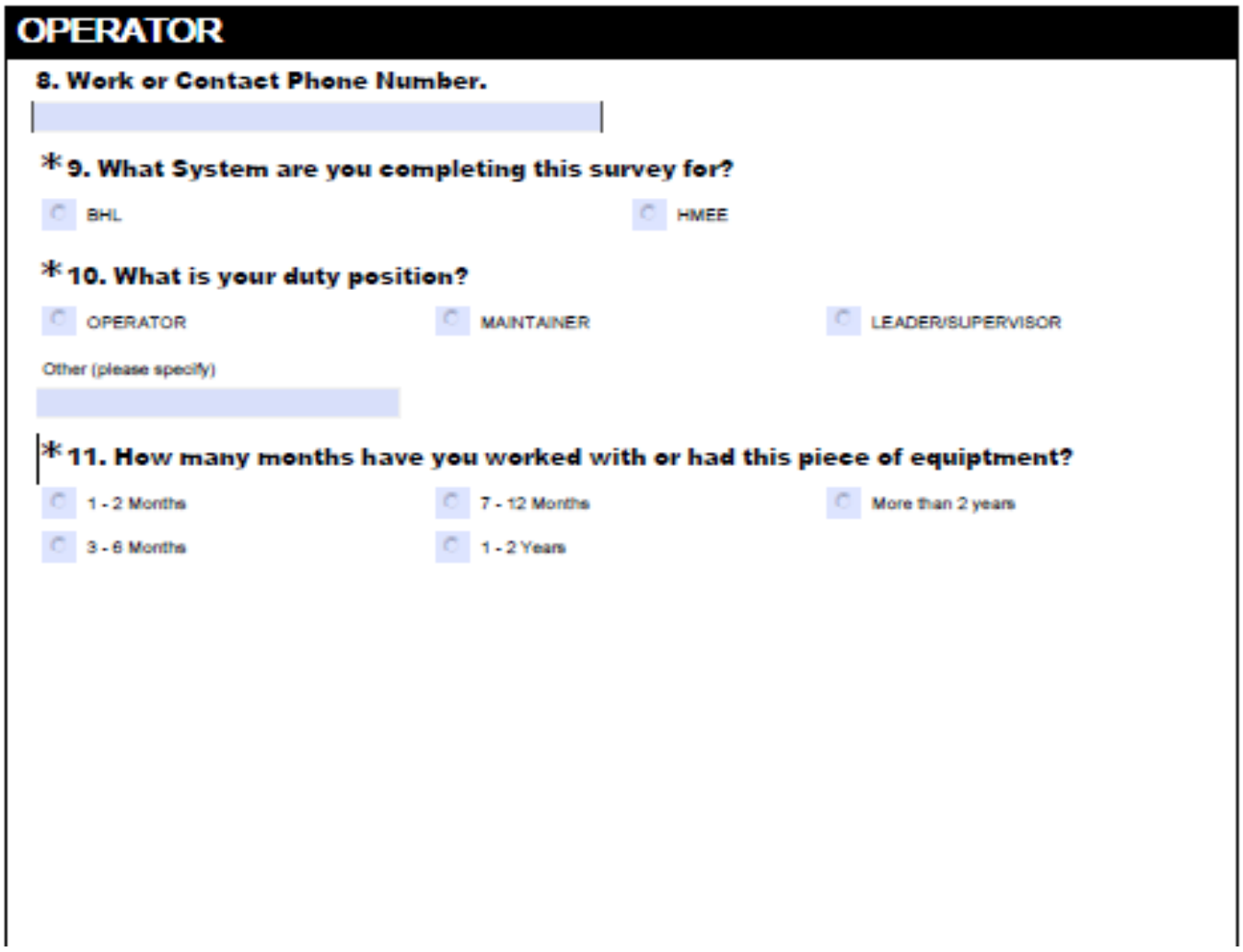
5. Skill Level

- I
- II
- III
- IV

6. Secondary MOS / Skill Level (If Applicable)

***7. Unit Identification and Location (PLEASE USE HOME STATION IF YOU ARE CURRENTLY DEPLOYED)**

Page 1



OPERATOR

8. Work or Contact Phone Number.

*** 9. What System are you completing this survey for?**

- BHL
- HMEE

*** 10. What is your duty position?**

- OPERATOR
- MAINTAINER
- LEADER/SUPERVISOR

Other (please specify)

*** 11. How many months have you worked with or had this piece of equiptment?**

- 1 - 2 Months
- 7 - 12 Months
- More than 2 years
- 3 - 6 Months
- 1 - 2 Years

The Demographic Portion of all three surveys (OPERATOR, MAINTAINER and LEADER/ SUPERVISOR consisted of the same 11 questions. The position specific questions follow. The OPERATOR and MAINTAINER specific questions start on p. 3 of the individual surveys, the LEADER questions start on p. 2 directly after Question 11:

OPERATOR

OPERATOR - TRAINING and OPERATION

Provide insights, opinions, and comments as necessary to cover the discussion area if you are an OPERATOR.

***12. Identify the sources of training you received for this system.**

- [ ] NET
- [ ] OJT
- [ ] NONE
- [ ] AIT/USAES
- [ ] Unit SME

Other (please specify)

13. Did you receive training materials on this system? (CD, Manual, etc)

- ( ) YES
- ( ) NO

***14. Did you receive or have access to an operator manual for PMCS?**

- ( ) YES
- ( ) NO

15. Did any of the manuals cover operator level maintenance tasks (other than PMCS)?

- ( ) YES
- ( ) NO
- ( ) I Dont Know

***16. Did you experience any equipment problems that required Contractor Logistical Support (CLS)? (If NO, move to question 21)**

- ( ) YES
- ( ) NO

17. If you answered YES to question 16, approximate how many times did your system need CLS?

Number of Problems

18. Approximately how many months was CLS available?

Number of Months

19. Approximately how many of these problems were warranty related?

Number of Problems (enter ZERO if you don't know)

20. Approximately how long was your system non-operational during a repair once the CLS team was notified?

Number of Hours

If more than a day, number of Days

OPERATOR

21. How do you think your equipment was maintained by CLS when compared to traditional unit maintenance?

- CLS is much better than unit maintenance (1)
- CLS is some-what better than unit maintenance (2)
- There was no difference between CLS and unit maintenance (3)
- Unit maintenance some-what better than CLS (4)
- Unit maintenance is much better than CLS (5)
- I don't know if there was a difference (6)

22. Have you used the BHL or HMEE while deployed?

- YES
- NO
- Not Applicable

23. Were there any situations that you were aware of where CLS had a negative effect on the unit's mission (effected movement, project completion, etc.)?

- YES
- NO
- I Don't Know

24. Please provide any comments you may have on CLS or unit maintenance.

MAINTAINER

MAINTAINER - TRAINING and OPERATION

Provide insights, opinions, and comments as necessary to cover the discussion area if you are a UNIT EQUIPMENT MAINTAINER.

***12. Identify the sources of training you received for this system.**

- [ ] FLMNET
- [ ] OJT
- [ ] NONE
- [ ] AIT/USAES
- [ ] Unit SME

Other (please specify)

13. Did you receive training materials on this system? (CD, Manual, etc)

- ( ) YES
- ( ) NO

***14. Did you receive or have access to maintenance/parts manuals for the system?**

- ( ) YES
- ( ) NO
- ( ) I Don't Remember

15. As a unit mechanic, were you authorized to repair or conduct services on the equipment that was assigned CLS? (IF NO, Go to Question 21)

- ( ) YES
- ( ) NO

16. Did you repair any equipment problems that could have been corrected by CLS? (If NO, move to question 21)

- ( ) YES
- ( ) NO

17. If you answered YES to question 16, how many times did you make a repair?

Number of Problems

18. Approximatly how many months was CLS available?

Number of Months

19. Approximately how many of these problems were warranty related?

Number of Problems

I Don't Know (enter Zero)

20. Approximately how long was your system non-operational during a repair once the CLS team was notified that you could not make the repair?

Number of Hours

If more than a day, number of Days

MAINTAINER

21. Did you operate or repair the BHL or HMEE while deployed?

- YES
- NO
- Not Applicable

22. How do you think your equipment was maintained by CLS when compared to traditional unit maintenance?

- CLS is much better than unit maintenance (1)
- CLS is some-what better than unit maintenance (2)
- There was no difference between CLS and unit maintenance (3)
- Unit maintenance some-what better than CLS (4)
- Unit maintenance is much better than CLS (5)
- I don't know if there was a difference (6)

23. Were there any situations that you were aware of where CLS had a negative effect on the unit's mission (effected movement, project completion, etc.)?

- YES
- NO
- I Don't Know

24. Please provide any comments you may have on CLS or unit maintenance.

UNIT LEADERSHIP INPUT

Provide insights, opinions, and comments as necessary to cover the discussion area if you are a UNIT LEADER.

***12. Were you satisfied with the training your operators received on the system?**

- YES
- There was no Unit Training that I am aware of
- NO
- N/A

***13. Were you satisfied with the training your maintainers received on the system?**

- YES
- There was no Unit Training that I am aware of
- NO
- N/A

14. Did your Unit receive training manuals on the system?

- YES
- NO
- N/A

***15. Did your Unit receive sufficient maintenance/parts manuals for the system?**

- YES
- Does Not Apply, CLS did everything
- NO
- N/A

16. If your Unit received training from the CLS vendor, did it meet unit needs?

- YES
- Unit did not receive training from CLS vendor
- NO

LEADER/SUPERVISOR

17. Did the CLS contractor meet Unit needs in the all the key areas of system repair?

- Never (1)
- Some of the time (2)
- About half of the time (3)
- Most of the time (4)
- All the time (5)
- Don't know (6)
- Does Not apply (7)

18. Did the CLS contractor meet Unit needs in the all the key areas of system service?

- Never (1)
- Some of the time (2)
- About half of the time (3)
- Most of the time (4)
- All the time (5)
- Don't know (6)
- Does Not apply (7)

19. How do you think your Unit's equipment was maintained by CLS when compared to the traditional unit maintenance your maintainers perform? (if necessary comment at the end of the survey)

- CLS is much better than unit maintenance (1)
- CLS is some-what better than unit maintenance (2)
- There was no difference between CLS and unit maintenance (3)
- Unit maintenance some-what better than CLS (4)
- Unit maintenance is much better than CLS (5)
- I don't know if there was a difference (6)

20. How long did it take the CLS team to complete an average repair?

Number of Hours

If more than a day, Number of Days

LEADER/SUPERVISOR

21. Were any issues experienced causing extended down time?

YES NO

If YES, What were they?

22. Were there any situations that you were aware of where CLS had a negative effect on the unit's mission (effected movement, project completion, etc.)?

YES I Don't Know

NO

23. Did your unit operators or maintainers operate or prepair the BHL or HMEE while deployed?

YES Not Applicable

NO I Don't Know

24. Were unit recovery operations with the CLS vendor and your Unit maintenance section a team effort?

YES NO N/A

25. Did the CLS vendor have any effect on your Unit's tactical or administrative footprint?

YES NO N/A

26. Please provide any comments you may have on CLS or its affects on your Unit.

APPENDIX B
DISPOSITION, BHL SYSTEMS

MACOM	City/Installation	State	Receiving Unit	TYPE OF UNIT	UIC (From Distr. Plan)	QTY BHL AUTH.	Serial #	UID Serial #	Reg Number	NET Planned/ Completed
AC	FT LEONARD WOOD	MO	103 HORIZONTAL CONST CO	E	WCW5AA	1	N8C422203	BHL10210	UC095B	14-Jan-10
AC	FT LEONARD WOOD	MO	103 HORIZONTAL CONST CO	E	WCW5AA	1	N8C422204	BHL10211	UC095C	14-Jan-10
AC	FT HOOD	TX	104 VERTICAL CONST CO	E	WDXYAA	1	N8C422213	BHL10220	UC095M	21-Jan-10
AC	FT HOOD	TX	104 VERTICAL CONST CO	E	WDXYAA	1	N8C422216	BHL10223	UC095Q	21-Jan-10
AC	FT HOOD	TX	104 VERTICAL CONST CO	E	WDXYAA	1	N8C422217	BHL10224	UC095R	21-Jan-10
AC	FT KNOX	KY	15 HORIZONTAL CONST CO	E	WDZRAA	1	N9C422554	BHL10561	UC09SF	28-Oct-10
AC	FT KNOX	KY	15 HORIZONTAL CONST CO	E	WDZRAA	1	N9C422567	BHL10574	UC09SU	28-Oct-10
AC	FT POLK	LA	178 VERTICAL CONST CO	E	WBCBAA	1	N9C422480	BHL10487	UC09Q9	17-Jun-10
AC	FT POLK	LA	178 VERTICAL CONST CO	E	WBCBAA	1	N9C422481	BHL10488	UC09QA	17-Jun-10
AC	FT POLK	LA	178 VERTICAL CONST CO	E	WBCBAA	1	N9C422482	BHL10489	UC09QB	17-Jun-10
AC	FT LEONARD WOOD	MO	232 HORIZONTAL CONST CO	E	WD79AA	1	N8C422205	BHL10212	UC095D	14-Jan-10
AC	FT LEONARD WOOD	MO	232 HORIZONTAL CONST CO	E	WD79AA	1	N8C422207	BHL10214	UC095F	14-Jan-10
AC	FT CARSON	CO	497 HORIZONTAL CONST CO	E	WBC8AA	1	N9C422529	BHL10536	UC09RQ	20-May-10
AC	FT CARSON	CO	497 HORIZONTAL CONST CO	E	WBC8AA	1	NAC532612	BHL10606	UC09WQ	20-May-10
AC	SCHWEINFURT	GERMANY	500 HORIZONTAL CONST CO	E	WBCTAA	1	NAC532614	BHL10608	UC09WS	15-Jul-10
AC	SCHWEINFURT	GERMANY	500 HORIZONTAL CONST CO	E	WBCTAA	1	NAC532619	BHL10613	UC09WX	15-Jul-10
AC	SCHOFIELD	HI	523 HORIZONTAL CONST CO	E	WD5EAA	1	N9C422571	BHL10578	UC09SY	15-Apr-10
AC	SCHOFIELD	HI	523 HORIZONTAL CONST CO	E	WD5EAA	1	N9C422572	BHL10579	UC09SZ	15-Apr-10
AC	FT STEWART	GA	526 HORIZONTAL CONST CO	E	WBCXAA	1	N8C422128	BHL10131	UC0930	15-Oct-09
AC	FT STEWART	GA	526 HORIZONTAL CONST CO	E	WBCXAA	1	N8C422129	BHL10132	UC0931	15-Oct-09
AC	FT CARSON	CO	544 VERTICAL CONST CO	E	WDVBAA	1	N9C422535	BHL10542	UC09RW	20-May-10
AC	FT CARSON	CO	544 VERTICAL CONST CO	E	WDVBAA	1	N9C422550	BHL10557	UC09SB	20-May-10
AC	FT CARSON	CO	544 VERTICAL CONST CO	E	WDVBAA	1	N9C422558	BHL10565	UC09SK	20-May-10
AC	FT STEWART	GA	554 VERTICAL CONST CO	E	WBBNAA	1	N8C422125	BHL10129	UC092Y	15-Oct-09
AC	FT STEWART	GA	554 VERTICAL CONST CO	E	WBBNAA	1	N8C422127	BHL10130	UC092Z	15-Oct-09
AC	FT STEWART	GA	554 VERTICAL CONST CO	E	WBBNAA	1	N8C422126	BHL10146	UC093F	15-Oct-09
AC	FT LEWIS	WA	557 HORIZONTAL CONST CO	E	WBB0AA	1	N9C422395	BHL10402	UC09CY	25-Mar-10
AC	FT LEWIS	WA	557 HORIZONTAL CONST CO	E	WBB0AA	1	N9C422396	BHL10403	UC09CZ	25-Mar-10
AC	FT RICHARDSON	AK	56 VERTICAL CONST CO	E	WBA1AA	1	NAC532623	BHL10617	UC09X1	1-Jul-10
AC	FT RICHARDSON	AK	56 VERTICAL CONST CO	E	WBA1AA	1	NAC532624	BHL10618	UC09X2	1-Jul-10
AC	FT RICHARDSON	AK	56 VERTICAL CONST CO	E	WBA1AA	1	NAC532625	BHL10619	UC09X3	1-Jul-10
AC	SCHOFIELD	HI	561 HORIZONTAL CONST CO	E	WBA2AA	1	N9C422568	BHL10575	UC09SV	15-Apr-10
AC	SCHOFIELD	HI	561 HORIZONTAL CONST CO	E	WBA2AA	1	N9C422569	BHL10576	UC09SW	15-Apr-10
AC	FT LEWIS	WA	585 VERTICAL CONST CO	E	WBBEAA	1	N9C422392	BHL10399	UC09CV	25-Mar-10
AC	FT LEWIS	WA	585 VERTICAL CONST CO	E	WBBEAA	1	N9C422393	BHL10400	UC09CW	25-Mar-10
AC	FT LEWIS	WA	585 VERTICAL CONST CO	E	WBBEAA	1	N9C422394	BHL10401	UC09CX	25-Mar-10
AC	FT BENNING	GA	60 VERTICAL CONST CO	E	WE0UAA	1	N8C422137	BHL10140	UC0939	5-Nov-09
AC	FT BENNING	GA	60 VERTICAL CONST CO	E	WE0UAA	1	N8C422138	BHL10141	UC093A	5-Nov-09
AC	FT BENNING	GA	60 VERTICAL CONST CO	E	WE0UAA	1	N8C422136	BHL10149	UC0938	5-Nov-09
AC	FT CARSON	CO	615 HORIZONTAL CONST CO	E	WD74AA	1	N9C422400	BHL10407	UC09D3	20-May-10
AC	FT CARSON	CO	615 HORIZONTAL CONST CO	E	WD74AA	1	N9C422451	BHL10458	UC09PE	20-May-10

AC	FT LEWIS	WA	617 HORIZONTAL CONST CO	E	WBCZAA	1	N9C422390	BHL10397	UC09CT	25-Mar-10
AC	FT LEWIS	WA	617 HORIZONTAL CONST CO	E	WBCZAA	1	N9C422391	BHL10398	UC09CU	25-Mar-10
AC	FT BENNING	GA	63 HORIZONTAL CONST CO	E	WBC3AA	1	N8C422134	BHL10137	UC0936	5-Nov-09
AC	FT BENNING	GA	63 HORIZONTAL CONST CO	E	WBC3AA	1	N8C422135	BHL10138	UC0937	5-Nov-09
AC	SCHOFIELD	HI	643 VERTICAL CONST CO	E	WBC6AA	1	N9C422508	BHL10515	UC09R3	15-Apr-10
AC	SCHOFIELD	HI	643 VERTICAL CONST CO	E	WBC6AA	1	N9C422574	BHL10581	UC09T1	15-Apr-10
AC	SCHOFIELD	HI	643 VERTICAL CONST CO	E	WBC6AA	1	N9C422577	BHL10584	UC09T4	15-Apr-10
AC	FT HOOD	TX	68 HORIZONTAL CONST CO	E	WBC4AA	1	N8C422208	BHL10215	UC095G	21-Jan-10
AC	FT HOOD	TX	68 HORIZONTAL CONST CO	E	WBC4AA	1	N8C422210	BHL10217	UC095J	21-Jan-10
AC	FT POLK	LA	687 HORIZONTAL CONST CO	E	WETAAA	1	N9C422475	BHL10482	UC09Q4	17-Jun-10
AC	FT POLK	LA	687 HORIZONTAL CONST CO	E	WETAAA	1	N9C422476	BHL10483	UC09Q5	17-Jun-10
AC	FT HOOD	TX	697 HORIZONTAL CONST CO	E	WBC7AA	1	N8C422211	BHL10218	UC095K	21-Jan-10
AC	FT HOOD	TX	697 HORIZONTAL CONST CO	E	WBC7AA	1	N8C422212	BHL10219	UC095L	21-Jan-10
AC	FT KNOX	KY	76 VERTICAL CONST CO	E	WHNGAA	1	NAC532640	BHL10634	UC09XJ	28-Oct-10
AC	FT KNOX	KY	76 VERTICAL CONST CO	E	WHNGAA	1	NAC532650	BHL10644	UC09XU	28-Oct-10
AC	FT KNOX	KY	76 VERTICAL CONST CO	E	WHNGAA	1	NAC532687	BHL10681	UC09YX	28-Oct-10
AC	FT LEONARD WOOD	MO	77 VERTICAL CONST CO	E	WDZTAA	1	N8C422200	BHL10207	UC0958	14-Jan-10
AC	FT LEONARD WOOD	MO	77 VERTICAL CONST CO	E	WDZTAA	1	N8C422201	BHL10208	UC0959	14-Jan-10
AC	FT LEONARD WOOD	MO	77 VERTICAL CONST CO	E	WDZTAA	1	N8C422202	BHL10209	UC095A	14-Jan-10
AC	SCHWEINFURT	GERMANY	902 VERTICAL CONST CO	E	WD73AA	1	NAC532600	BHL10594	UC09WC	15-Jul-10
AC	SCHWEINFURT	GERMANY	902 VERTICAL CONST CO	E	WD73AA	1	NAC532602	BHL10596	UC09WE	15-Jul-10
AC	SCHWEINFURT	GERMANY	902 VERTICAL CONST CO	E	WD73AA	1	NAC532622	BHL10616	UC09X0	15-Jul-10
AC	FT POLK	LA	93 VERTICAL CONST CO	E	WBBFAA	1	N9C422477	BHL10484	UC09Q6	17-Jun-10
AC	FT POLK	LA	93 VERTICAL CONST CO	E	WBBFAA	1	N9C422478	BHL10485	UC09Q7	17-Jun-10
AC	FT POLK	LA	93 VERTICAL CONST CO	E	WBBFAA	1	N9C422479	BHL10486	UC09Q8	17-Jun-10
AC	FT STEWART	GA	984 HORIZONTAL CONST CO	E	WBCQAA	1	N8C422123	BHL10127	UC092W	15-Oct-09
AC	FT STEWART	GA	984 HORIZONTAL CONST CO	E	WBCQAA	1	N8C422165	BHL10172	UC0947	15-Oct-09
						68				
AR	SAN ANTONIO	TX	277 HORIZONTAL CONST CO	E	WRYGAA	1	N9C422275	BHL10282	UC099E	Mar-10
AR	SAN ANTONIO	TX	277 HORIZONTAL CONST CO	E	WRYGAA	1	N9C422309	BHL10316	UC09AE	Mar-10
AR	FT CARSON	CO	282 HORIZONTAL CONST CO	E	WTMLAA	1	N9C422339	BHL10346	UC09BA	24-Feb-10
AR	FT CARSON	CO	282 HORIZONTAL CONST CO	E	WTMLAA	1	N9C422344	BHL10351	UC09BF	24-Feb-10
AR	SEAGOVILLE	TX	284 VERTICAL CONST CO	E	WRYHAA	1	NAC532690	BHL10684	UC09MK	Jan-10
AR	SEAGOVILLE	TX	284 VERTICAL CONST CO	E	WRYHAA	1	NAC532693	BHL10687	UC09Z1	Jan-10
AR	SEAGOVILLE	TX	284 VERTICAL CONST CO	E	WRYHAA	1	NAC532694	BHL10688	UC09Z2	Jan-10
AR	FT RICHARDSON	AK	297 HORIZONTAL CONST CO	E	WS5YAA	1	NAC532606	BHL10600	UC09WJ	1-Jul-10
AR	FT RICHARDSON	AK	297 HORIZONTAL CONST CO	E	WS5YAA	1	NAC532608	BHL10602	UC09WL	1-Jul-10
AR	SAN ANTONIO	TX	302 VERTICAL CONST CO	E	WTGDAA	1	N9C422322	BHL10329	UC09AT	13-Mar-10
AR	SAN ANTONIO	TX	302 VERTICAL CONST CO	E	WTGDAA	1	N9C422324	BHL10331	UC09AV	13-Mar-10
AR	SAN ANTONIO	TX	302 VERTICAL CONST CO	E	WTGDAA	1	N9C422325	BHL10332	UC09AW	13-Mar-10
AR	LIMA	OH	304 VERTICAL CONST CO	E	WRC4AA	1	N8C422238	BHL10245	UC096C	Apr-10
AR	LIMA	OH	304 VERTICAL CONST CO	E	WRC4AA	1	N8C422245	BHL10252	UC096K	Apr-10
AR	LIMA	OH	304 VERTICAL CONST CO	E	WRC4AA	1	N9C422254	BHL10261	UC098V	Apr-10
AR	AMITYVILLE	NY	306 VERTICAL CONST CO	E	WS5ZAA	1	N8C422224	BHL10231	UC095Y	May-10
AR	AMITYVILLE	NY	306 VERTICAL CONST CO	E	WS5ZAA	1	N8C422230	BHL10237	UC0964	May-10
AR	AMITYVILLE	NY	306 VERTICAL CONST CO	E	WS5ZAA	1	N8C422231	BHL10238	UC0965	May-10
AR	DULUTH	MN	312 HORIZONTAL CONST CO	E	WRZQAA	1	N8C422189	BHL10196	UC094X	Aug-10
AR	DULUTH	MN	312 HORIZONTAL CONST CO	E	WRZQAA	1	N8C422190	BHL10197	UC094Y	Aug-10
AR	KANKAKEE	IL	317 HORIZONTAL CONST CO	E	WRCPAA	1	N9C422333	BHL10340	UC09B4	Oct-10
AR	KANKAKEE	IL	317 HORIZONTAL CONST CO	E	WRCPAA	1	N9C422334	BHL10341	UC09B5	Oct-10
AR	DECORAH	IA	322 VERTICAL CONST CO	E	WRCWAA	1	N9C422282	BHL10289	UC099M	13-Mar-10
AR	DECORAH	IA	322 VERTICAL CONST CO	E	WRCWAA	1	N9C422285	BHL10292	UC099Q	13-Mar-10
AR	DECORAH	IA	322 VERTICAL CONST CO	E	WRCWAA	1	N9C422286	BHL10293	UC099R	13-Mar-10
AR	ONALASKA	WI	327 VERTICAL CONST CO	E	WRY2AA	1	N9C422323	BHL10330	UC09AU	Sep-10
AR	ONALASKA	WI	327 VERTICAL CONST CO	E	WRY2AA	1	N9C422326	BHL10333	UC09AX	Sep-10
AR	ONALASKA	WI	327 VERTICAL CONST CO	E	WRY2AA	1	N9C422328	BHL10335	UC09AZ	Sep-10
AR	READING	PA	333 HORIZONTAL CONST CO	E	WRZJAA	1	N9C422452	BHL10459	UC09PF	Mar-10
AR	READING	PA	333 HORIZONTAL CONST CO	E	WRZJAA	1	NAC532610	BHL10604	UC09WN	Mar-10
AR	WEIRTON	WV	336 VERTICAL CONST CO	E	WRCSAA	1	N9C422463	BHL10470	UC09PS	Apr-10
AR	WEIRTON	WV	336 VERTICAL CONST CO	E	WRCSAA	1	N9C422465	BHL10472	UC09PU	Apr-10
AR	WEIRTON	WV	336 VERTICAL CONST CO	E	WRCSAA	1	N9C422467	BHL10474	UC09PW	Apr-10
AR	ATTLEBORO	MA	338 HORIZONTAL CONST CO	E	WRZRAA	1	N9C422253	BHL10260	UC098U	17-Mar-10
AR	ATTLEBORO	MA	338 HORIZONTAL CONST CO	E	WRZRAA	1	N9C422256	BHL10263	UC098X	17-Mar-10
AR	NEW KENSINGTON	PA	340 HORIZONTAL CONST CO	E	WRZAAA	1	N9C422417	BHL10424	UC09DL	May-10
AR	NEW KENSINGTON	PA	340 HORIZONTAL CONST CO	E	WRZAAA	1	N9C422428	BHL10435	UC09DX	May-10
AR	NEW CUMBERLAND	PA	358 VERTICAL CONST CO	E	WRCZAA	1	N9C422429	BHL10436	UC09DY	May-10

AR	NEW CUMBERLAND	PA	358 VERTICAL CONST CO	E	WRCZAA	1	N9C422430	BHL10437	UC09DZ	May-10
AR	NEW CUMBERLAND	PA	358 VERTICAL CONST CO	E	WRCZAA	1	N9C422432	BHL10439	UC09E1	May-10
AR	PEWAUKEE	WI	372 VERTICAL CONST CO	E	WRCRAA	1	N9C422445	BHL10452	UC09P8	Apr-10
AR	PEWAUKEE	WI	372 VERTICAL CONST CO	E	WRCRAA	1	N9C422449	BHL10456	UC09PC	Apr-10
AR	PEWAUKEE	WI	372 VERTICAL CONST CO	E	WRCRAA	1	N9C422453	BHL10460	UC09PG	Apr-10
AR	BUTLER	PA	377 VERTICAL CONST CO	E	WRGNAA	1	N9C422437	BHL10444	UC09P0	6-Mar-10
AR	BUTLER	PA	377 VERTICAL CONST CO	E	WRGNAA	1	N9C422441	BHL10448	UC09P4	6-Mar-10
AR	BUTLER	PA	377 VERTICAL CONST CO	E	WRGNAA	1	N9C422446	BHL10453	UC09P9	6-Mar-10
AR	PHOENIX	AZ	387 HORIZONTAL CONST CO	E	WRZLAA	1	N9C422346	BHL10353	UC09BH	Mar-10
AR	PHOENIX	AZ	387 HORIZONTAL CONST CO	E	WRZLAA	1	N9C422348	BHL10355	UC09BK	Mar-10
AR	MIDDLETON	IA	389 VERTICAL CONST CO	E	WRCXAA	1	N9C422272	BHL10279	UC099B	13-Mar-10
AR	MIDDLETON	IA	389 VERTICAL CONST CO	E	WRCXAA	1	N9C422274	BHL10281	UC099D	13-Mar-10
AR	MIDDLETON	IA	389 VERTICAL CONST CO	E	WRCXAA	1	N9C422276	BHL10283	UC099F	13-Mar-10
AR	CHATTANOOGA	TN	390 VERTICAL CONST CO	E	WRCTAA	1	N9C422252	BHL10259	UC098T	6-Mar-10
AR	CHATTANOOGA	TN	390 VERTICAL CONST CO	E	WRCTAA	1	N9C422500	BHL10507	UC09QV	6-Mar-10
AR	CHATTANOOGA	TN	390 VERTICAL CONST CO	E	WRCTAA	1	N9C422501	BHL10508	UC09QW	6-Mar-10
AR	FT COLLINS	CO	409 VERTICAL CONST CO	E	WRZGAA	1	N9C422355	BHL10362	UC09BS	24-Feb-10
AR	FT COLLINS	CO	409 VERTICAL CONST CO	E	WRZGAA	1	N9C422357	BHL10364	UC09BU	24-Feb-10
AR	FT COLLINS	CO	409 VERTICAL CONST CO	E	WRZGAA	1	N9C422361	BHL10368	UC09BY	24-Feb-10
AR	IOWA CITY	IA	411 HORIZONTAL CONST CO	E	WRCMAA	1	N9C422443	BHL10450	UC09P6	24-Feb-10
AR	IOWA CITY	IA	411 HORIZONTAL CONST CO	E	WRCMAA	1	N9C422444	BHL10451	UC09P7	24-Feb-10
AR	SCRANTON	PA	412 VERTICAL CONST CO	E	WRZHAA	1	N9C422447	BHL10454	UC09PA	May-10
AR	SCRANTON	PA	412 VERTICAL CONST CO	E	WRZHAA	1	N9C422448	BHL10455	UC09PB	May-10
AR	SCRANTON	PA	412 VERTICAL CONST CO	E	WRZHAA	1	N9C422450	BHL10457	UC09PD	May-10
AR	BULLVILLE	NY	417 HORIZONTAL CONST CO	E	WRCNAA	1	N9C422273	BHL10280	UC099C	10-Mar-10
AR	BULLVILLE	NY	417 HORIZONTAL CONST CO	E	WRCNAA	1	N9C422279	BHL10286	UC099J	10-Mar-10
AR	RUTLAND	VT	424 VERTICAL CONST CO	E	WS5SAA	1	N9C422281	BHL10288	UC099L	17-Mar-10
AR	RUTLAND	VT	424 VERTICAL CONST CO	E	WS5SAA	1	N9C422290	BHL10297	UC099V	17-Mar-10
AR	RUTLAND	VT	424 VERTICAL CONST CO	E	WS5SAA	1	N9C422304	BHL10311	UC09A9	17-Mar-10
AR	FARGO	ND	461 VERTICAL CONST CO	E	WRZMAA	1	N9C422305	BHL10312	UC09AA	24-Feb-10
AR	FARGO	ND	461 VERTICAL CONST CO	E	WRZMAA	1	N9C422315	BHL10322	UC09AL	24-Feb-10
AR	FARGO	ND	461 VERTICAL CONST CO	E	WRZMAA	1	N9C422320	BHL10327	UC09AR	24-Feb-10
AR	FT BUCHANAN	PR	471 VERTICAL CONST CO	E	WRYNAA	1	N8C422186	BHL10193	UC094U	17-Dec-09
AR	FT BUCHANAN	PR	471 VERTICAL CONST CO	E	WRYNAA	1	N8C422187	BHL10194	UC094V	17-Dec-09
AR	FT BUCHANAN	PR	471 VERTICAL CONST CO	E	WRYNAA	1	N8C422191	BHL10198	UC094Z	17-Dec-09
AR	PONCE	PR	475 HORIZONTAL CONST CO	E	WRZBAA	1	N8C422179	BHL10186	UC094M	17-Dec-09
AR	PONCE	PR	475 HORIZONTAL CONST CO	E	WRZBAA	1	N8C422180	BHL10187	UC094N	17-Dec-09
AR	ROCKFORD	IL	485 VERTICAL CONST CO	E	WRC3AA	1	N9C422291	BHL10298	UC099W	24-Feb-10
AR	ROCKFORD	IL	485 VERTICAL CONST CO	E	WRC3AA	1	N9C422294	BHL10301	UC099Z	24-Feb-10
AR	ROCKFORD	IL	485 VERTICAL CONST CO	E	WRC3AA	1	N9C422296	BHL10303	UC09A1	24-Feb-10
AR	MONCLOVA	OH	486 VERTICAL CONST CO	E	WRY6AA	1	N8C422195	BHL10202	UC0953	Apr-10
AR	MONCLOVA	OH	486 VERTICAL CONST CO	E	WRY6AA	1	N8C422226	BHL10233	UC0960	Apr-10
AR	MONCLOVA	OH	486 VERTICAL CONST CO	E	WRY6AA	1	N8C422229	BHL10236	UC0963	Apr-10
AR	MANKATO	MN	492 VERTICAL CONST CO	E	WRKLAA	1	N9C422297	BHL10304	UC09A2	Sep-09
AR	MANKATO	MN	492 VERTICAL CONST CO	E	WRKLAA	1	N9C422301	BHL10308	UC09A6	Sep-09
AR	MANKATO	MN	492 VERTICAL CONST CO	E	WRKLAA	1	N9C422302	BHL10309	UC09A7	Sep-09
AR	SPOKANE	WA	659 HORIZONTAL CONST CO	E	WRYPAA	1	N9C422338	BHL10345	UC09B9	Mar-10
AR	SPOKANE	WA	659 HORIZONTAL CONST CO	E	WRYPAA	1	N9C422349	BHL10356	UC09BL	Mar-10
AR	BROOKVILLE	PA	665 VERTICAL CONST CO	E	WRC5AA	1	NAC532605	BHL10599	UC09WH	3-Mar-10
AR	BROOKVILLE	PA	665 VERTICAL CONST CO	E	WRC5AA	1	NAC532616	BHL10610	UC09WU	3-Mar-10
AR	BROOKVILLE	PA	665 VERTICAL CONST CO	E	WRC5AA	1	NAC532618	BHL10612	UC09WW	3-Mar-10
AR	ORANGEBURG	NY	668 VERTICAL CONST CO	E	WRC1AA	1	N9C422306	BHL10313	UC09AB	10-Mar-10
AR	ORANGEBURG	NY	668 VERTICAL CONST CO	E	WRC1AA	1	N9C422307	BHL10314	UC09AC	10-Mar-10
AR	ORANGEBURG	NY	668 VERTICAL CONST CO	E	WRC1AA	1	N9C422497	BHL10504	UC09QS	10-Mar-10
AR	FT MISSOULA	MT	672 VERTICAL CONST CO	E	WRC2AA	1	N9C422351	BHL10358	UC09BN	Aug-10
AR	FT MISSOULA	MT	672 VERTICAL CONST CO	E	WRC2AA	1	N9C422353	BHL10360	UC09BQ	Aug-10
AR	FT MISSOULA	MT	672 VERTICAL CONST CO	E	WRC2AA	1	N9C422354	BHL10361	UC09BR	Aug-10
AR	JOHNSON CITY	TN	702 HORIZONTAL CONST CO	E	WRCLAA	1	N9C422489	BHL10496	UC09QJ	6-Mar-10
AR	JOHNSON CITY	TN	702 HORIZONTAL CONST CO	E	WRCLAA	1	N9C422493	BHL10500	UC09QN	6-Mar-10
AR	SOMERSWORTH	NH	716 VERTICAL CONST CO	E	WRC0AA	1	N9C422504	BHL10511	UC09QZ	27-Feb-10
AR	SOMERSWORTH	NH	716 VERTICAL CONST CO	E	WRC0AA	1	N9C422511	BHL10518	UC09R6	27-Feb-10
AR	SOMERSWORTH	NH	716 VERTICAL CONST CO	E	WRC0AA	1	N9C422513	BHL10520	UC09R8	27-Feb-10
AR	FT BENNING	GA	718 HORIZONTAL CONST CO	E	WRY7AA	1	N8C422124	BHL10128	UC092X	19-Nov-09
AR	FT BENNING	GA	718 HORIZONTAL CONST CO	E	WRY7AA	1	N8C422149	BHL10156	UC093R	19-Nov-09
AR	GRAND PRAIRE	TX	721 HORIZONTAL CONST CO	E	WRYXAA	1	NAC532613	BHL10607	UC09WR	24-Feb-10
AR	GRAND PRAIRE	TX	721 HORIZONTAL CONST CO	E	WRYXAA	1	NAC532700	BHL10694	UC09Z8	24-Feb-10

AR	GREENVILLE	TN	733 VERTICAL CONST CO	E	WRCVAA	1	N9C422406	BHL10413	UC09D9	10-Mar-10
AR	GREENVILLE	TN	733 VERTICAL CONST CO	E	WRCVAA	1	N9C422490	BHL10497	UC09QK	10-Mar-10
AR	GREENVILLE	TN	733 VERTICAL CONST CO	E	WRCVAA	1	N9C422492	BHL10499	UC09QM	10-Mar-10
AR	CEIBO	PR	756 HORIZONTAL CONST CO	E	WRGXAA	1	N8C422181	BHL10188	UC094P	17-Dec-09
AR	CEIBO	PR	756 HORIZONTAL CONST CO	E	WRGXAA	1	N8C422185	BHL10192	UC094T	17-Dec-09
AR	PERRINE	FL	758 VERTICAL CONST CO	E	WQ1TAA	1	N9C422491	BHL10498	UC09QL	6-Mar-10
AR	PERRINE	FL	758 VERTICAL CONST CO	E	WQ1TAA	1	N9C422506	BHL10513	UC09R1	6-Mar-10
AR	PERRINE	FL	758 VERTICAL CONST CO	E	WQ1TAA	1	N9C422507	BHL10514	UC09R2	6-Mar-10
AR	MARION	VA	760 VERTICAL CONST CO	E	WRY8AA	1	N9C422530	BHL10537	UC09RR	May-10
AR	MARION	VA	760 VERTICAL CONST CO	E	WRY8AA	1	N9C422541	BHL10548	UC09S2	May-10
AR	MARION	VA	760 VERTICAL CONST CO	E	WRY8AA	1	N9C422560	BHL10567	UC09SM	May-10
AR	FT LAUDERDALE	FL	766 HORIZONTAL CONST CO	E	WRCQAA	1	N9C422498	BHL10505	UC09QT	24-Feb-10
AR	FT LAUDERDALE	FL	766 HORIZONTAL CONST CO	E	WRCQAA	1	N9C422499	BHL10506	UC09QU	24-Feb-10
AR	PENNYAN	NY	770 HORIZONTAL CONST CO	E	WQ12AA	1	N9C422515	BHL10522	UC09RA	3-Mar-10
AR	PENNYAN	NY	770 HORIZONTAL CONST CO	E	WQ12AA	1	N9C422519	BHL10526	UC09RE	3-Mar-10
AR	PARKERSBURG	WV	779 HORIZONTAL CONST CO	E	WS5XAA	1	N9C422404	BHL10411	UC09D7	Mar-10
AR	PARKERSBURG	WV	779 HORIZONTAL CONST CO	E	WS5XAA	1	N9C422410	BHL10417	UC09DD	Mar-10
AR	BARRIGADA	GUAM	797 VERTICAL CONST CO	E	WRCYAA	1	N9C422565	BHL10572	UC09SS	23-Apr-10
AR	BARRIGADA	GUAM	797 VERTICAL CONST CO	E	WRCYAA	1	NAC532626	BHL10620	UC09X4	23-Apr-10
AR	BARRIGADA	GUAM	797 VERTICAL CONST CO	E	WRCYAA	1	NAC532627	BHL10621	UC09X5	23-Apr-10
AR	VALLEJO	CA	801 HORIZONTAL CONST CO	E	WRZPAA	1	N9C422356	BHL10363	UC09BT	27-Feb-10
AR	VALLEJO	CA	801 HORIZONTAL CONST CO	E	WRZPAA	1	N9C422358	BHL10365	UC09BV	27-Feb-10
AR	HOUSTON	TX	808 VERTICAL CONST CO	E	WS50AA	1	N9C422312	BHL10319	UC09AH	Jun-10
AR	HOUSTON	TX	808 VERTICAL CONST CO	E	WS50AA	1	N9C422319	BHL10326	UC09AQ	Jun-10
AR	HOUSTON	TX	808 VERTICAL CONST CO	E	WS50AA	1	N9C422321	BHL10328	UC09AS	Jun-10
AR	HILO	HI	871 VERTICAL CONST CO	E	WQX8AA	1	N9C422528	BHL10535	UC09RP	23-Apr-10
AR	HILO	HI	871 VERTICAL CONST CO	E	WQX8AA	1	N9C422534	BHL10541	UC09RV	23-Apr-10
AR	HILO	HI	871 VERTICAL CONST CO	E	WQX8AA	1	N9C422561	BHL10568	UC09SN	23-Apr-10
AR	FT LEONARD WOOD	MO	955 HORIZONTAL CONST CO	E	WRZUAA	1	N9C422375	BHL10382	UC09CC	27-Feb-10
AR	FT LEONARD WOOD	MO	955 HORIZONTAL CONST CO	E	WRZUAA	1	N9C422376	BHL10383	UC09CD	27-Feb-10
AR	SHARONVILLE	OH	961 HORIZONTAL CONST CO	E	WRZEAA	1	N8C422193	BHL10200	UC0951	Jul-10
AR	SHARONVILLE	OH	961 HORIZONTAL CONST CO	E	WRZEAA	1	N8C422194	BHL10201	UC0952	Jul-10
AR	FT DIX	NJ	990 VERTICAL CONST CO	E	WRYRAA	1	N8C422196	BHL10203	UC0954	14-Jan-10
AR	FT DIX	NJ	990 VERTICAL CONST CO	E	WRYRAA	1	N8C422198	BHL10205	UC0956	14-Jan-10
AR	FT DIX	NJ	990 VERTICAL CONST CO	E	WRYRAA	1	N8C422243	BHL10250	UC096H	14-Jan-10
AR	DENVER	CO	994 VERTICAL CONST CO	E	WVPRAA	1	N9C422345	BHL10352	UC09BG	6-Mar-10
AR	DENVER	CO	994 VERTICAL CONST CO	E	WVPRAA	1	N9C422347	BHL10354	UC09BJ	6-Mar-10
AR	DENVER	CO	994 VERTICAL CONST CO	E	WVPRAA	1	N9C422350	BHL10357	UC09BM	6-Mar-10
AR	MILWAUKEE	WI	996 HORIZONTAL CONST CO	E	WVPSAA	1	N9C422262	BHL10269	UC098L	Feb-10
AR	MILWAUKEE	WI	996 HORIZONTAL CONST CO	E	WVPSAA	1	N9C422271	BHL10278	UC099A	Feb-10
						144				
COMPO	CHARLESTON	SC	9086 HORIZONTAL CO	E	WMBWAA	1	N8C422073	BHL10080	UC091H	N/A
COMPO	CHARLESTON	SC	9086 HORIZONTAL CO	E	WMBWAA	1	N8C422083	BHL10090	UC091T	N/A
COMPO	CHARLESTON	SC	9087 VERTICAL CO	E	WMBVAA	1	N8C422096	BHL10103	UC0926	N/A
COMPO	CHARLESTON	SC	9087 VERTICAL CO	E	WMBVAA	1	N8C422098	BHL10105	UC0928	N/A
COMPO	CHARLESTON	SC	9087 VERTICAL CO	E	WMBVAA	1	N8C422104	BHL10111	UC092E	N/A
NG	VEGA BAJA	PR	1010 HORIZONTAL CONST CO	E	WX17AA	1	N8C422167	BHL10174	UC0949	17-Dec-09
NG	VEGA BAJA	PR	1010 HORIZONTAL CONST CO	E	WX17AA	1	N8C422169	BHL10176	UC094B	17-Dec-09
NG	VEGA BAJA	PR	1011 VERTICAL CONST CO	E	WX16AA	1	N8C422170	BHL10177	UC094C	17-Dec-09
NG	VEGA BAJA	PR	1011 VERTICAL CONST CO	E	WX16AA	1	N8C422172	BHL10179	UC094E	17-Dec-09
NG	VEGA BAJA	PR	1011 VERTICAL CONST CO	E	WX16AA	1	N8C422173	BHL10180	UC094F	17-Dec-09
NG	NO LITTLE ROCK	AR	1038 HORIZONTAL CONST CO	E	WX32AA	1	N9C422314	BHL10321	UC09AK	13-May-10
NG	NO LITTLE ROCK	AR	1038 HORIZONTAL CONST CO	E	WX32AA	1	N9C422332	BHL10339	UC09B3	13-May-10
NG	CLARKSBURG	WV	115 VERTICAL CONST CO	E	WPM3AA	1	NAC532660	BHL10654	UC09Y4	12-Sep-10
NG	SUMMERSVILLE	WV	115 VERTICAL CONST CO	E	WPM3AA	1	NAC532676	BHL10670	UC09YL	12-Sep-10
NG	CLARKSBURG	WV	115 VERTICAL CONST CO	E	WPM3AA	1	NAC532677	BHL10671	UC09YM	12-Sep-10
NG	KINGSTON	NY	1156 VERTICAL CONST CO	E	WX0JAA	1	N9C422486	BHL10493	UC09QF	15-Jul-10
NG	KINGSTON	NY	1156 VERTICAL CONST CO	E	WX0JAA	1	N9C422487	BHL10494	UC09QG	15-Jul-10
NG	KINGSTON	NY	1156 VERTICAL CONST CO	E	WX0JAA	1	N9C422488	BHL10495	UC09QH	15-Jul-10
NG	SPANISH FORK	UT	116 HORIZONTAL CONST CO	E	WY10AA	1	N9C422402	BHL10409	UC09D5	6-May-10
NG	SPANISH FORK	UT	116 HORIZONTAL CONST CO	E	WY10AA	1	N9C422411	BHL10418	UC09DE	6-May-10
NG	PORTSMOUTH	OH	1191 HORIZONTAL CONST CO	E	WX3CAA	1	N8C422168	BHL10175	UC094A	10-Dec-09

NG	PORTSMOUTH	OH	1191 HORIZONTAL CONST CO	E	WX3CAA	1	N8C422178	BHL10185	UC094L	10-Dec-09
NG	RAVENNA	OH	1192 HORIZONTAL CONST CO	E	WX7NAA	1	N9C422247	BHL10254	UC098N	10-Dec-09
NG	RAVENNA	OH	1192 HORIZONTAL CONST CO	E	WX7NAA	1	N9C422248	BHL10255	UC098P	10-Dec-09
NG	CHILLICOTHE	OH	1194 VERTICAL CONST CO	E	WX3AAA	1	N8C422184	BHL10191	UC094S	10-Dec-09
NG	CHILLICOTHE	OH	1194 VERTICAL CONST CO	E	WX3AAA	1	N8C422188	BHL10195	UC094W	10-Dec-09
NG	CHILLICOTHE	OH	1194 VERTICAL CONST CO	E	WX3AAA	1	N8C422228	BHL10235	UC0962	10-Dec-09
NG	OKMULGEE	OK	120 HORIZONTAL CONST CO	E	WY0ZAA	1	N9C422308	BHL10315	UC09AD	10-Jun-10
NG	OKMULGEE	OK	120 HORIZONTAL CONST CO	E	WY0ZAA	1	N9C422340	BHL10347	UC09BB	10-Jun-10
NG	SUMMERVILLE	SC	1223 VERTICAL CONST CO	E	WY19AA	1	N9C422377	BHL10384	UC09CE	11-Mar-10
NG	SUMMERVILLE	SC	1223 VERTICAL CONST CO	E	WY19AA	1	N9C422378	BHL10385	UC09CF	11-Mar-10
NG	SUMMERVILLE	SC	1223 VERTICAL CONST CO	E	WY19AA	1	N9C422379	BHL10386	UC09CG	11-Mar-10
NG	SALUDA	SC	124 HORIZONTAL CONST CO	E	WY16AA	1	N9C422380	BHL10387	UC09CH	11-Mar-10
NG	SALUDA	SC	124 HORIZONTAL CONST CO	E	WY16AA	1	N9C422381	BHL10388	UC09CJ	11-Mar-10
NG	CP ATTERBURY	IN	1313 HORIZONTAL CONST CO	E	WY12AA	1	N9C422546	BHL10553	UC09S7	14-Oct-10
NG	CP ATTERBURY	IN	1313 HORIZONTAL CONST CO	E	WY12AA	1	N9C422555	BHL10562	UC09SG	14-Oct-10
NG	PORTLAND	ME	136 VERTICAL CONST CO	E	WY1AAA	1	N9C422317	BHL10324	UC09AN	20-May-10
NG	PORTLAND	ME	136 VERTICAL CONST CO	E	WY1AAA	1	N9C422327	BHL10334	UC09AY	20-May-10
NG	PORTLAND	ME	136 VERTICAL CONST CO	E	WY1AAA	1	N9C422337	BHL10344	UC09B8	20-May-10
NG	NEW ALBANY	IN	1413 VERTICAL CONST CO	E	WY18AA	1	N9C422539	BHL10546	UC09S0	14-Oct-10
NG	NEW ALBANY	IN	1413 VERTICAL CONST CO	E	WY18AA	1	N9C422543	BHL10550	UC09S4	14-Oct-10
NG	NEW ALBANY	IN	1413 VERTICAL CONST CO	E	WY18AA	1	N9C422545	BHL10552	UC09S6	14-Oct-10
NG	CALUMET	MI	1430 VERTICAL CONST CO	E	WX7TAA	1	N9C422405	BHL10412	UC09D8	22-Apr-10
NG	CALUMET	MI	1430 VERTICAL CONST CO	E	WX7TAA	1	N9C422407	BHL10414	UC09DA	22-Apr-10
NG	CALUMET	MI	1430 VERTICAL CONST CO	E	WX7TAA	1	N9C422409	BHL10416	UC09DC	22-Apr-10
NG	CP GRAYLING	MI	1434 VERTICAL CONST CO	E	WX7SAA	1	N9C422412	BHL10419	UC09DF	Aug-10
NG	CP GRAYLING	MI	1434 VERTICAL CONST CO	E	WX7SAA	1	N9C422413	BHL10420	UC09DG	Aug-10
NG	CP GRAYLING	MI	1434 VERTICAL CONST CO	E	WX7SAA	1	N9C422414	BHL10421	UC09DH	Aug-10
NG	MONTAGUE	MI	1436 HORIZONTAL CONST CO	E	WX8PAA	1	N8C422223	BHL10230	UC095X	Aug-10
NG	MONTAGUE	MI	1436 HORIZONTAL CONST CO	E	WX8PAA	1	N9C422415	BHL10422	UC09DJ	Aug-10
NG	CYNTHIANA	KY	149 VERTICAL CONST CO	E	WY0LAA	1	N9C422382	BHL10389	UC09CK	11-Mar-10
NG	CYNTHIANA	KY	149 VERTICAL CONST CO	E	WY0LAA	1	N9C422383	BHL10390	UC09CL	11-Mar-10
NG	CYNTHIANA	KY	149 VERTICAL CONST CO	E	WY0LAA	1	N9C422384	BHL10391	UC09CM	11-Mar-10
NG	SEA GIRT	NJ	150 HORIZONTAL CONST CO	E	WY14AA	1	N9C422549	BHL10556	UC09SA	24-Mar-11
NG	SEA GIRT	NJ	150 HORIZONTAL CONST CO	E	WY14AA	1	N9C422553	BHL10560	UC09SE	24-Mar-11
NG	WAGNER	SD	155 VERTICAL CONST CO	E	WX9RAA	1	N9C422431	BHL10438	UC09E0	8-Apr-10
NG	WAGNER	SD	155 VERTICAL CONST CO	E	WX9RAA	1	N9C422434	BHL10441	UC09E3	8-Apr-10
NG	WAGNER	SD	155 VERTICAL CONST CO	E	WX9RAA	1	N9C422455	BHL10462	UC09PJ	8-Apr-10
NG	MIDDLETOWN	DE	160 VERTICAL CONST CO	E	WY0HAA	1	N9C422433	BHL10440	UC09E2	10-Jun-10
NG	MIDDLETOWN	DE	160 VERTICAL CONST CO	E	WY0HAA	1	N9C422439	BHL10446	UC09P2	10-Jun-10
NG	MIDDLETOWN	DE	160 VERTICAL CONST CO	E	WY0HAA	1	N9C422454	BHL10461	UC09PH	10-Jun-10
NG	WINFIELD	AL	166 VERTICAL CONST CO	E	WY0JAA	1	N9C422278	BHL10285	UC099H	24-Jun-10
NG	WINFIELD	AL	166 VERTICAL CONST CO	E	WY0JAA	1	N9C422280	BHL10287	UC099K	24-Jun-10
NG	WINFIELD	AL	166 VERTICAL CONST CO	E	WY0JAA	1	N9C422287	BHL10294	UC099S	24-Jun-10
NG	VERNON	AL	168 HORIZONTAL CONST CO	E	WY0FAA	1	N9C422299	BHL10306	UC09A4	24-Jun-10
NG	VERNON	AL	168 HORIZONTAL CONST CO	E	WY0FAA	1	N9C422300	BHL10307	UC09A5	24-Jun-10
NG	SEATTLE	WA	176 VERTICAL CONST CO	E	WX0NAA	1	N9C422385	BHL10392	UC09CN	11-Apr-10
NG	SEATTLE	WA	176 VERTICAL CONST CO	E	WX0NAA	1	N9C422386	BHL10393	UC09CP	11-Apr-10
NG	SEATTLE	WA	176 VERTICAL CONST CO	E	WX0NAA	1	N9C422387	BHL10394	UC09CQ	11-Apr-10
NG	CP EDWARDS	MA	181 VERTICAL CONST CO	E	WX0LAA	1	N9C422420	BHL10427	UC09DP	13-May-10
NG	CP EDWARDS	MA	181 VERTICAL CONST CO	E	WX0LAA	1	N9C422427	BHL10434	UC09DW	13-May-10
NG	CP EDWARDS	MA	181 VERTICAL CONST CO	E	WX0LAA	1	N9C422442	BHL10449	UC09P5	13-May-10
NG	DOTHAN	AL	186 HORIZONTAL CONST CO	E	WY0GAA	1	N9C422289	BHL10296	UC099U	24-Jun-10
NG	DOTHAN	AL	186 HORIZONTAL CONST CO	E	WY0GAA	1	N9C422292	BHL10299	UC099X	24-Jun-10
NG	WAHPETON	ND	188 VERTICAL CONST CO	E	WY01AA	1	N8C422163	BHL10170	UC0945	31-Oct-09
NG	WAHPETON	ND	188 VERTICAL CONST CO	E	WY01AA	1	N8C422164	BHL10171	UC0946	31-Oct-09
NG	WAHPETON	ND	188 VERTICAL CONST CO	E	WY01AA	1	N8C422166	BHL10173	UC0948	31-Oct-09
NG	JACKSON	KY	207 HORIZONTAL CONST CO	E	WY0EAA	1	N8C422218	BHL10225	UC095S	11-Mar-10
NG	JACKSON	KY	207 HORIZONTAL CONST CO	E	WY0EAA	1	N8C422219	BHL10226	UC095T	11-Mar-10
NG	PARIS	TN	212 VERTICAL CONST CO	E	WX3JAA	1	N9C422250	BHL10257	UC098R	21-Jan-10
NG	PARIS	TN	212 VERTICAL CONST CO	E	WX3JAA	1	N9C422251	BHL10258	UC098S	21-Jan-10

NG	PARIS	TN	212 VERTICAL CONST CO	E	WX3JAA	1	N9C422255	BHL10262	UC098W	21-Jan-10
NG	MUSKOGEE	OK	2120 VERTICAL CONST CO	E	WY1BAA	1	N9C422298	BHL10305	UC09A3	10-Jun-10
NG	MUSKOGEE	OK	2120 VERTICAL CONST CO	E	WY1BAA	1	N9C422303	BHL10310	UC09A8	10-Jun-10
NG	MUSKOGEE	OK	2120 VERTICAL CONST CO	E	WY1BAA	1	N9C422457	BHL10464	UC09PL	10-Jun-10
NG	AIBONITO	PR	215 VERTICAL CONST CO	E	WPL8AA	1	N8C422174	BHL10181	UC094G	17-Dec-09
NG	AIBONITO	PR	215 VERTICAL CONST CO	E	WPL8AA	1	N8C422176	BHL10183	UC094J	17-Dec-09
NG	AIBONITO	PR	215 VERTICAL CONST CO	E	WPL8AA	1	N8C422177	BHL10184	UC094K	17-Dec-09
NG	FESTUS	MO	220 HORIZONTAL CONST CO	E	WX2MAA	1	N9C422473	BHL10480	UC09Q2	17-Jun-10
NG	FESTUS	MO	220 HORIZONTAL CONST CO	E	WX2MAA	1	N9C422474	BHL10481	UC09Q3	17-Jun-10
NG	AUGUSTA	KS	226 VERTICAL CONST CO	E	WX1AAA	1	N8C422117	BHL10121	UC092Q	25-Oct-09
NG	AUGUSTA	KS	226 VERTICAL CONST CO	E	WX1AAA	1	N8C422118	BHL10122	UC092R	25-Oct-09
NG	AUGUSTA	KS	226 VERTICAL CONST CO	E	WX1AAA	1	N8C422119	BHL10123	UC092S	25-Oct-09
NG	PLATTEVILLE	WI	229 HORIZONTAL CONST CO	E	WY13AA	1	N9C422311	BHL10318	UC09AG	29-Apr-10
NG	PLATTEVILLE	WI	229 HORIZONTAL CONST CO	E	WY13AA	1	N9C422316	BHL10323	UC09AM	29-Apr-10
NG	PEARL CITY	HI	230 VERTICAL CONST CO	E	WX2YAA	1	N9C422468	BHL10475	UC09PX	23-Apr-10
NG	PEARL CITY	HI	230 VERTICAL CONST CO	E	WX2YAA	1	N9C422559	BHL10566	UC09SL	23-Apr-10
NG	PEARL CITY	HI	230 VERTICAL CONST CO	E	WX2YAA	1	N9C422562	BHL10569	UC09SP	23-Apr-10
NG	WARRENTON	OR	234 VERTICAL CONST CO	E	WPJUAA	1	N9C422514	BHL10521	UC09R9	22-Jul-10
NG	WARRENTON	OR	234 VERTICAL CONST CO	E	WPJUAA	1	N9C422516	BHL10523	UC09RB	22-Jul-10
NG	WARRENTON	OR	234 VERTICAL CONST CO	E	WPJUAA	1	N9C422586	BHL10593	UC09TD	22-Jul-10
NG	ABILENE	TX	236 VERTICAL CONST CO	E	WX3UAA	1	N9C422521	BHL10528	UC09RG	19-Aug-10
NG	ABILENE	TX	236 VERTICAL CONST CO	E	WX3UAA	1	N9C422522	BHL10529	UC09RH	19-Aug-10
NG	ABILENE	TX	236 VERTICAL CONST CO	E	WX3UAA	1	N9C422524	BHL10531	UC09RK	19-Aug-10
NG	LAS VEGAS	NV	240 VERTICAL CONST CO	E	WPK2AA	1	NAC532621	BHL10615	UC09WZ	21-Oct-10
NG	LAS VEGAS	NV	240 VERTICAL CONST CO	E	WPK2AA	1	NAC532630	BHL10624	UC09X8	21-Oct-10
NG	LAS VEGAS	NV	240 VERTICAL CONST CO	E	WPK2AA	1	NAC532651	BHL10645	UC09XV	21-Oct-10
NG	COFFEYVILLE	KS	242 HORIZONTAL CONST CO	E	WX19AA	1	N8C422120	BHL10124	UC092T	25-Oct-09
NG	COFFEYVILLE	KS	242 HORIZONTAL CONST CO	E	WX19AA	1	N8C422121	BHL10125	UC092U	25-Oct-09
NG	ELLICOTT	MD	244 VERTICAL CONST CO	E	WX11AA	1	N9C422517	BHL10524	UC09RC	22-Jul-10
NG	ELLICOTT	MD	244 VERTICAL CONST CO	E	WX11AA	1	N9C422518	BHL10525	UC09RD	22-Jul-10
NG	ELLICOTT	MD	244 VERTICAL CONST CO	E	WX11AA	1	N9C422520	BHL10527	UC09RF	22-Jul-10
NG	COLCHESTER	VT	251 HORIZONTAL CONST CO	E	WPJ6AA	1	N9C422403	BHL10410	UC09D6	6-May-10
NG	COLCHESTER	VT	251 HORIZONTAL CONST CO	E	WPJ6AA	1	N9C422495	BHL10502	UC09QQ	6-May-10
NG	JOHNSTOWN	PA	252 HORIZONTAL CONST CO	E	WX1EAA	1	N9C422401	BHL10408	UC09D4	29-Jul-10
NG	JOHNSTOWN	PA	252 HORIZONTAL CONST CO	E	WX1EAA	1	N9C422458	BHL10465	UC09PM	29-Jul-10
NG	PHOENIX	AZ	258 HORIZONTAL CONST CO	E	WX0ZAA	1	N8C422162	BHL10169	UC0944	10-Dec-09
NG	PHOENIX	AZ	258 HORIZONTAL CONST CO	E	WX0ZAA	1	N8C422220	BHL10227	UC095U	10-Dec-09
NG	LEWISTON	ME	262 HORIZONTAL CONST CO	E	WY15AA	1	N9C422310	BHL10317	UC09AF	20-May-10
NG	LEWISTON	ME	262 HORIZONTAL CONST CO	E	WY15AA	1	N9C422313	BHL10320	UC09AJ	20-May-10
NG	ANGLETON	TX	272 VERTICAL CONST CO	E	WX3VAA	1	N8C422144	BHL10151	UC093L	29-Oct-09
NG	ANGLETON	TX	272 VERTICAL CONST CO	E	WX3VAA	1	N8C422145	BHL10152	UC093M	29-Oct-09
NG	ANGLETON	TX	272 VERTICAL CONST CO	E	WX3VAA	1	N8C422146	BHL10153	UC093N	29-Oct-09
NG	MONETT	MO	276 VERTICAL CONST CO	E	WX2LAA	1	N9C422460	BHL10467	UC09PP	17-Jun-10
NG	MONETT	MO	276 VERTICAL CONST CO	E	WX2LAA	1	N9C422472	BHL10479	UC09Q1	17-Jun-10
NG	MONETT	MO	276 VERTICAL CONST CO	E	WX2LAA	1	N9C422583	BHL10590	UC09TA	17-Jun-10
NG	SNOHOMISH	WA	286 HORIZONTAL CONST CO	E	WX0PAA	1	N9C422388	BHL10395	UC09CR	11-Apr-10
NG	SNOHOMISH	WA	286 HORIZONTAL CONST CO	E	WX0PAA	1	N9C422389	BHL10396	UC09CS	11-Apr-10
NG	OXNARD	CA	315 VERTICAL CONST CO	E	WX0BAA	1	N8C422233	BHL10240	UC0967	1-Apr-10
NG	OXNARD	CA	315 VERTICAL CONST CO	E	WX0BAA	1	N8C422234	BHL10241	UC0968	1-Apr-10
NG	OXNARD	CA	315 VERTICAL CONST CO	E	WX0BAA	1	N8C422235	BHL10242	UC0969	1-Apr-10
NG	BASTROP	TX	342 HORIZONTAL CONST CO	E	WX22AA	1	N8C422142	BHL10139	UC093J	29-Oct-09
NG	BASTROP	TX	342 HORIZONTAL CONST CO	E	WX22AA	1	N8C422143	BHL10150	UC093K	29-Oct-09
NG	BOURNE	MA	379 HORIZONTAL CONST CO	E	WPJ2AA	1	N8C422139	BHL10143	UC093C	29-Oct-09
NG	BOURNE	MA	379 HORIZONTAL CONST CO	E	WPJ2AA	1	N8C422140	BHL10147	UC093G	29-Oct-09
NG	OMAHA	NE	623 VERTICAL CONST CO	E	WX2ZAA	1	N9C422542	BHL10549	UC09S3	29-Jul-10
NG	OMAHA	NE	623 VERTICAL CONST CO	E	WX2ZAA	1	N9C422547	BHL10554	UC09S8	29-Jul-10
NG	OMAHA	NE	623 VERTICAL CONST CO	E	WX2ZAA	1	N9C422552	BHL10559	UC09SD	29-Jul-10
NG	W JORDAN	UT	624 VERTICAL CONST CO	E	WY17AA	1	N9C422418	BHL10425	UC09DM	6-May-10
NG	W JORDAN	UT	624 VERTICAL CONST CO	E	WY17AA	1	N9C422423	BHL10430	UC09DS	6-May-10
NG	W JORDAN	UT	624 VERTICAL CONST CO	E	WY17AA	1	N9C422424	BHL10431	UC09DT	6-May-10
NG	CHICO	CA	649 HORIZONTAL CONST CO	E	WX0GAA	1	N8C422236	BHL10243	UC096A	1-Apr-10
NG	CHICO	CA	649 HORIZONTAL CONST CO	E	WX0GAA	1	N8C422237	BHL10244	UC096B	1-Apr-10
NG	SPARTA	IL	661 HORIZONTAL CONST CO	E	WX1KAA	1	N9C422246	BHL10253	UC098M	7-Jan-10
NG	SPARTA	IL	661 HORIZONTAL CONST CO	E	WX1KAA	1	N9C422249	BHL10256	UC098Q	7-Jan-10
NG	EDGELEY	ND	815 HORIZONTAL CONST CO	E	WY00AA	1	N8C422150	BHL10157	UC093S	31-Oct-09
NG	EDGELEY	ND	815 HORIZONTAL CONST CO	E	WY00AA	1	N8C422151	BHL10158	UC093T	31-Oct-09

NG	DICKNISON	ND	816 HORIZONTAL CONST CO	E	WX9ZAA	1	N8C422153	BHL10160	UC093V	31-Oct-09
NG	DICKNISON	ND	816 HORIZONTAL CONST CO	E	WX9ZAA	1	N8C422157	BHL10164	UC093Z	31-Oct-09
NG	CLARKSBURG	WV	821 HORIZONTAL CONST CO	E	WPLJAA	1	NAC532661	BHL10655	UC09Y5	12-Sep-10
NG	SUMMERSVILLE	WV	821 HORIZONTAL CONST CO	E	WPLJAA	1	NAC532663	BHL10657	UC09Y7	12-Sep-10
NG	STEPHENVILLE	TX	822 HORIZONTAL CONST CO	E	WX3WAA	1	N8C422147	BHL10154	UC093P	29-Oct-09
NG	STEPHENVILLE	TX	822 HORIZONTAL CONST CO	E	WX3WAA	1	N8C422148	BHL10155	UC093Q	29-Oct-09
NG	HORSEHEAD	NY	828 HORIZONTAL CONST CO	E	WX0HAA	1	N9C422484	BHL10491	UC09QD	15-Jul-10
NG	HORSEHEAD	NY	828 HORIZONTAL CONST CO	E	WX0HAA	1	N9C422485	BHL10492	UC09QE	15-Jul-10
NG	ASHLAND	WI	829 VERTICAL CONST CO	E	WY1LAA	1	N9C422318	BHL10325	UC09AP	29-Apr-10
NG	ASHLAND	WI	829 VERTICAL CONST CO	E	WY1LAA	1	N9C422335	BHL10342	UC09B6	29-Apr-10
NG	ASHLAND	WI	829 VERTICAL CONST CO	E	WY1LAA	1	N9C422336	BHL10343	UC09B7	29-Apr-10
NG	BURLINGTON	IA	831 HORIZONTAL CONST CO	E	WX7WAA	1	N8C422197	BHL10204	UC0955	28-Jan-10
NG	BURLINGTON	IA	831 HORIZONTAL CONST CO	E	WX7WAA	1	N8C422244	BHL10251	UC096J	28-Jan-10
NG	SPEARFISH	SD	842 HORIZONTAL CONST CO	E	WX9QAA	1	N9C422419	BHL10426	UC09DN	8-Apr-10
NG	SPEARFISH	SD	842 HORIZONTAL CONST CO	E	WX9QAA	1	N9C422425	BHL10432	UC09DU	8-Apr-10
NG	CAMBRIDGE	MN	850 HORIZONTAL CONST CO	E	WX01AA	1	N9C422257	BHL10264	UC098Y	29-Apr-10
NG	CAMBRIDGE	MN	850 HORIZONTAL CONST CO	E	WX01AA	1	N9C422258	BHL10265	UC098Z	29-Apr-10
NG	LITTLE FALLS	MN	851 VERTICAL CONST CO	E	WPM8AA	1	N9C422259	BHL10266	UC0990	29-Apr-10
NG	LITTLE FALLS	MN	851 VERTICAL CONST CO	E	WPM8AA	1	N9C422260	BHL10267	UC0991	29-Apr-10
NG	LITTLE FALLS	MN	851 VERTICAL CONST CO	E	WPM8AA	1	N9C422261	BHL10268	UC098K	29-Apr-10
NG	LIVE OAK	FL	868 HORIZONTAL CONST CO	E	WPJ8AA	1	N9C422581	BHL10588	UC09T8	5-Aug-10
NG	LIVE OAK	FL	868 HORIZONTAL CONST CO	E	WPJ8AA	1	N9C422582	BHL10589	UC09T9	5-Aug-10
NG	STARKE	FL	869 VERTICAL CONST CO	E	WPJGAA	1	N9C422573	BHL10580	UC09T0	5-Aug-10
NG	STARKE	FL	869 VERTICAL CONST CO	E	WPJGAA	1	N9C422579	BHL10586	UC09T6	5-Aug-10
NG	STARKE	FL	869 VERTICAL CONST CO	E	WPJGAA	1	N9C422580	BHL10587	UC09T7	5-Aug-10
NG	N. WILKESBORO	NC	875 HORIZONTAL CONST CO	E	WX0RAA	1	N9C422263	BHL10270	UC0992	28-Jan-10
NG	N. WILKESBORO	NC	875 HORIZONTAL CONST CO	E	WX0RAA	1	N9C422264	BHL10271	UC0993	28-Jan-10
NG	SWAINSBORO	GA	876 VERTICAL CONST CO	E	WX03AA	1	N9C422531	BHL10538	UC09RS	26-Aug-10
NG	SWAINSBORO	GA	876 VERTICAL CONST CO	E	WX03AA	1	N9C422532	BHL10539	UC09RT	26-Aug-10
NG	SWAINSBORO	GA	876 VERTICAL CONST CO	E	WX03AA	1	N9C422533	BHL10540	UC09RU	26-Aug-10
NG	FT GORDON	GA	877 HORIZONTAL CONST CO	E	WX02AA	1	N9C422527	BHL10534	UC09RN	26-Aug-10
NG	FT GORDON	GA	877 HORIZONTAL CONST CO	E	WX02AA	1	N9C422557	BHL10564	UC09SJ	26-Aug-10
NG	KINGS MTN	NC	878 VERTICAL CONST CO	E	WX0SAA	1	N9C422268	BHL10275	UC0997	28-Jan-10
NG	KINGS MTN	NC	878 VERTICAL CONST CO	E	WX0SAA	1	N9C422269	BHL10276	UC0998	28-Jan-10
NG	KINGS MTN	NC	878 VERTICAL CONST CO	E	WX0SAA	1	N9C422270	BHL10277	UC0999	28-Jan-10
NG	MOCKSVILLE	NC	882 VERTICAL CONST CO	E	WX0TAA	1	N9C422265	BHL10272	UC0994	28-Jan-10
NG	MOCKSVILLE	NC	882 VERTICAL CONST CO	E	WX0TAA	1	N9C422266	BHL10273	UC0995	28-Jan-10
NG	MOCKSVILLE	NC	882 VERTICAL CONST CO	E	WX0TAA	1	N9C422267	BHL10274	UC0996	28-Jan-10
NG	UNION CITY	TN	913 HORIZONTAL CONST CO	E	WX3KAA	1	N8C422222	BHL10229	UC095W	21-Jan-10
NG	UNION CITY	TN	913 HORIZONTAL CONST CO	E	WX3KAA	1	N8C422225	BHL10232	UC095Z	21-Jan-10
NG	ROSWELL	NM	920 HORIZONTAL CONST CO	E	WPLHAA	1	NAC532631	BHL10625	UC09X9	2-Sep-10
NG	ROSWELL	NM	920 HORIZONTAL CONST CO	E	WPLHAA	1	NAC532632	BHL10626	UC09XA	2-Sep-10
NG	BATON ROUGE	LA	921 HORIZONTAL CONST CO	E	WY3DAA	1	N8C422113	BHL10117	UC092L	22-Oct-09
NG	BATON ROUGE	LA	921 HORIZONTAL CONST CO	E	WY3DAA	1	N8C422114	BHL10118	UC092M	22-Oct-09
NG	CP BEAUREGARD	LA	922 HORIZONTAL CONST CO	E	WY3EAA	1	N8C422115	BHL10119	UC092N	22-Oct-09
NG	CP BEAUREGARD	LA	922 HORIZONTAL CONST CO	E	WY3EAA	1	N8C422116	BHL10120	UC092P	22-Oct-09
NG	COLORADO SPRINGS	CO	947 HORIZONTAL CONST CO	E	WPH5AA	1	N9C422293	BHL10300	UC099Y	20-May-10
NG	COLORADO SPRINGS	CO	947 HORIZONTAL CONST CO	E	WPH5AA	1	N9C422295	BHL10302	UC09A0	20-May-10
NGB	NEW ORLEANS	LA	1020 VERTICAL CONST CO	E	WX2CAA	1	N6C422020	BHL10027	UC08QS	
NGB	NEW ORLEANS	LA	1020 VERTICAL CONST CO	E	WX2CAA	1	N6C422021	BHL10028	UC08QT	
NGB	NEW ORLEANS	LA	1020 VERTICAL CONST CO	E	WX2CAA	1	N6C422022	BHL10029	UC08QU	
NGB	NEW ORLEANS	LA	1021 VERTICAL CONST CO	E	WX2BAA	1	N6C422023	BHL10030	UC08QV	
NGB	NEW ORLEANS	LA	1021 VERTICAL CONST CO	E	WX2BAA	1	N6C422024	BHL10031	UC08QW	
NGB	NEW ORLEANS	LA	1021 VERTICAL CONST CO	E	WX2BAA	1	N6C422025	BHL10033	UC08QX	
NGB	NEW ORLEANS	LA	1022 VERTICAL CONST CO	E	WX2AAA	1	N6C422026	BHL10032	UC08QY	
NGB	NEW ORLEANS	LA	1022 VERTICAL CONST CO	E	WX2AAA	1	N6C422027	BHL10034	UC08QZ	
NGB	NEW ORLEANS	LA	1022 VERTICAL CONST CO	E	WX2AAA	1	N6C422028	BHL10035	UC08R0	
NGB	NEW ORLEANS	LA	1023 VERTICAL CONST CO	E	WX29AA	1	N6C422029	BHL10036	UC08R1	
NGB	NEW ORLEANS	LA	1023 VERTICAL CONST CO	E	WX29AA	1	N6C422030	BHL10037	UC08R2	
NGB	NEW ORLEANS	LA	1023 VERTICAL CONST CO	E	WX29AA	1	N6C422031	BHL10038	UC08R3	
NGB	CAMP SHELBY	MS	289 VERTICAL CONST CO	E	WX1PAA	1	N6C422001	BHL10008	UC08Q7	
NGB	CAMP SHELBY	MS	289 VERTICAL CONST CO	E	WX1PAA	1	N6C422002	BHL10009	UC08Q8	
NGB	CAMP SHELBY	MS	289 VERTICAL CONST CO	E	WX1PAA	1	N6C422003	BHL10010	UC08Q9	
NGB	NEW ORLEANS	LA	843 HORIZONTAL CONST CO	E	WX2EAA	1	N6C422016	BHL10023	UC08QN	
NGB	NEW ORLEANS	LA	843 HORIZONTAL CONST CO	E	WX2EAA	1	N6C422017	BHL10024	UC08QP	
NGB	NEW ORLEANS	LA	844 HORIZONTAL CONST CO	E	WX2DAA	1	N6C422018	BHL10025	UC08QQ	

NGB	NEW ORLEANS	LA	844 HORIZONTAL CONST CO	E	WX2DAA	1	N6C422019	BHL10026	UC08QR	
NGB	CAMP SHELBY	MS	857 HORIZONTAL CONST CO	E	WX1VAA	1	N6C422004	BHL10011	UC08QA	
NGB	CAMP SHELBY	MS	857 HORIZONTAL CONST CO	E	WX1VAA	1	N6C422005	BHL10012	UC08QB	
NGB	CAMP SHELBY	MS	858 HORIZONTAL CONST CO	E	WX1UAA	1	N6C422006	BHL10013	UC08QC	
NGB	CAMP SHELBY	MS	858 HORIZONTAL CONST CO	E	WX1UAA	1	N6C422007	BHL10014	UC08QD	
NGB	CAMP SHELBY	MS	859 VERTICAL CONST CO	E	WX7JAA	1	N6C422008	BHL10015	UC08QE	
NGB	CAMP SHELBY	MS	859 VERTICAL CONST CO	E	WX7JAA	1	N6C422009	BHL10016	UC08QF	
NGB	CAMP SHELBY	MS	859 VERTICAL CONST CO	E	WX7JAA	1	N6C422010	BHL10017	UC08QG	
						221				

APPENDIX C
DISPOSITION, HMEE SYSTEMS

G8 Fielding Date	QTY	COMPO	UNIT	Type of BCT	UIC	LOCATION	STATE
3-Feb-10	2	AC	911th ENG CO	Technical Rescue Engineer Company	W40RAA	FT BELVOIR	VA
14-Mar-10	6	AC	ENG TROOP, (2 ACR-SBCT 2)	SBCT	WBA4AA	GRAFENWEHR	GERMANY
May-11	4	AC	502 ENG CO (MRBC)	MRBC	WBBHAA	FT KNOX	KY
18-Feb-10	4	AC	74 ENG CO (MRBC)	MRBC	WBBUAA	FT HOOD	TX
11-Jun-09	4	AC	362 ENG CO (MRBC)	MRBC	WBBXAA	FT BENNING	GA
16-Mar-10	6	AC	535 ENGINEER SUPPORT COMPANY	ESC	WBBZAA	GRAFENWOH	GERMANY
20-Sep-09	6	AC	66 ENG CO (2/25 ID- SBCT 5)	SBCT	WBDHAA	SCHOFIELD	HI
3-Apr-09	6	AC	82 ENGINEER SUPPORT COMPANY	ESC	WBJ2AA	SCHOFIELD	HI
10-Dec-09	6	AC	642 ENGINEER SUPPORT COMPANY	ESC	WD75AA	FT DRUM	NY
15-Oct-10	6	AC	73rd ENG CO 1/25th SBCT	SBCT	WD77AA	FT WAINWRIGHT	AK
18-Feb-10	3	AC	43 ENG CO, ACR (3 ACR) (AVLBs)	ACR	WDEGAA	FT HOOD	TX
22-Oct-09	6	AC	610 ENGINEER SUPPORT COMPANY	ESC	WDXXAA	FT LEWIS	WA
5-Feb-09	6	AC	18 ENG CO (3/2 ID- SBCT 1)	SBCT	WE0VAA	FT LEWIS	WA
4-Aug-10	6	AC	887 ENGINEER SUPPORT COMPANY	ESC	WEWAAA	FT CAMPBELL	KY
15-May-09	3	AC	EN CO BSTB (1/3ID)	HBCT	WJJJAA	FT STEWART	GA
1-May-09	3	AC	EN CO BSTB (2/3ID)	HBCT	WJJKAA	FT STEWART	GA
8-May-09	3	AC	EN CO BSTB (3/3ID)	HBCT	WJJLAA	FT BENNING	GA
5-Jun-09	3	AC	EN CO, BSTB 4TH BCT/ 3RD ID (4/3ID)	IBCT	WJJMAA	FT STEWART	GA
6-Mar-09	4	AC	EN CO, BSTB 2ND BCT/ 101ST (AA)	IBCT	WJJSAA	FT CAMPBELL	KY
20-Mar-09	4	AC	EN CO, BSTB 3RD BCT/ 101ST (AA)	IBCT	WJJTAA	FT CAMPBELL	KY
9-Apr-10	4	AC	EN CO, BSTB 4TH BCT/ 101ST (AA)	IBCT	WJJUAA	FT CAMPBELL	KY
2-Dec-09	4	AC	EN CO, BSTB 1ST BCT/ 10TH MTN	IBCT	WJJVAA	FT DRUM	NY
2-Dec-09	4	AC	EN CO, BSTB 2ND BCT/ 10TH MTN	IBCT	WJJWAA	FT DRUM	NY
2-Dec-09	4	AC	EN CO, BSTB 3RD BCT/ 10TH MTN	IBCT	WJJXAA	FT DRUM	NY
17-Sep-10	3	AC	EN CO BSTB (2/1CD)	HBCT	WJK0AA	FT HOOD	TX
17-Sep-10	3	AC	EN CO BSTB (3/1CD)	HBCT	WJK1AA	FT HOOD	TX
Oct-10	3	AC	EN CO BSTB (4/1AD)	HBCT	WJK2AA	FT BLISS	TX
13-Jun-10	4	AC	EN CO, BSTB 4TH BCT/ 10TH MTN	IBCT	WJKBAA	FT POLK	LA
28-Oct-10	3	AC	EN CO BSTB (1/4ID)	HBCT	WJKGAA	FT CARSON	CO
28-Oct-10	3	AC	EN CO BSTB (2/4ID)	HBCT	WJKHAA	FT CARSON	CO
28-Oct-10	3	AC	EN CO BSTB (3/4ID)	HBCT	WJKKAA	FT CARSON	CO
17-Feb-10	3	AC	EN CO BSTB (4/1CD)	HBCT	WJKLAA	FT HOOD	TX
8-Jan-09	6	AC	38 ENG CO (4/2 ID- SBCT 4)	SBCT	WJKRAA	FT LEWIS	WA
17-Sep-10	3	AC	EN CO BSTB (1/1CD)	HBCT	WJKZAA	FT HOOD	TX
23-Jul-10	3	AC	EN CO BSTB (1/2ID)	HBCT	WJL4AA	KOREA	
28-Oct-10	4	AC	EN CO, BSTB 4TH BCT/ 4TH ID (4/4 ID)	IBCT	WJL6AA	FT CARSON	CO
1-Oct-09	4	AC	EN CO, BSTB 3RD BCT/ 25TH ID (3/25 ID)	IBCT	WJLAAA	SCHOFIELD	HI
2-Nov-10	4	AC	EN CO, BSTB 3RD BCT/ 1ST ID (3/1 ID)	IBCT	WJLCAA	FT KNOX	KY
Nov-10	4	AC	EN CO, BSTB 4TH BCT/ 1ST ID (4/1 ID)	IBCT	WJLEAA	FT RILEY	KS
Nov-10	3	AC	EN CO BSTB (1/1ID)	HBCT	WJM1AA	FT RILEY	KS
Nov-10	3	AC	EN CO BSTB (2/1ID)	HBCT	WJM5AA	FT RILEY	KS
21-Sep-10	6	AC	562 ENG CO (5/2 ID- SBCT 7)	SBCT	WJMSAA	FT LEWIS	WA
30-Jan-09	6	AC	562 ENG CO (5/2 ID- SBCT 7)	SBCT	WJMTAA	FT LEWIS	WA
Oct-10	4	AC	EN CO, BSTB 3RD BCT/ 1ST AD (3/1 AD)	IBCT	WJTTAA	FT BLISS	TX
11-Dec-08	6	AC	Engineer School			FT LEONARWOOD	MO
13-Oct-10	4	AR	459 ENG CO (MRBC)	MRBC	WQ0YAA	CLARKSBURG	WV
14-Oct-10	6	AR	712 ENGINEER SUPPORT COMPANY	ESC	WRC7AA	YORK	SC
21-Oct-10	6	AR	380 ENGINEER SUPPORT COMPANY	ESC	WRC8AA	GREENVILLE	MS
13-Oct-10	4	AR	299 ENG CO (MRBC)	MRBC	WV3QAA	FT BELVOIR	VA
27-Sep-10	4	AR	739 ENG CO (MRBC)	MRBC	WVH2AA	EAST ST LOUIS	IL
7-Oct-10	4	AR	652 ENG CO (MRBC)	MRBC	WVK2AA	ELLSWORTH	WI
13-Oct-10	4	AR	310 ENG CO (MRBC)	MRBC	WZ5DAA	FREDERICKSURG	VA
11-Aug-09	6	NG	856 ENG CO (56/28 ID-SBCT 6)	SBCT	WP1VAA	PUNXSUTAWNEY	PA
21-Sep-10	4	NG	200 ENG CO (MRBC)	MRBC	WP78AA	CHAMBERLAIN	SD
May-11	3	NG	EN CO BSTB (30)	HBCT	WP7HAA	FAYETTEVILLE	NC
19-Feb-09	4	NG	EN CO, BSTB 2/34TH IBCT (34TH ID)	IBCT	WP8WAA	BOONE	IA
Nov-10	4	NG	250 ENG CO (MRBC)	MRBC	WP8YAA	DANIELSON	CT
Jan-11	4	NG	EN CO, BSTB 48TH IBCT	IBCT	WP9ZAA	MACON	GA
15-Oct-09	4	NG	EN CO, BSTB 29TH IBCT	IBCT	WPB5AA	HONOLULU	HI

Jul-11	4	NG	EN CO, BSTB 27TH IBCT (42ND ID)	IBCT	WPBFAA	BUFFALO	NY
Mar-11	4	NG	1041 ENG CO (MRBC)	MRBC	WPEUAA	ROCK SPRINGS	WY
8-Jun-10	4	NG	125 ENG CO (MRBC)	MRBC	WPUXAA	ABBEVILLE	SC
Jul-11	6	NG	631 ENGINEER SUPPORT COMPANY	ESC	WX1LAA	LAWERENCEVILLE	IL
May-11	6	NG	180 ENGINEER SUPPORT COMPANY	ESC	WX2UAA	POWHATTEN	VA
Jun-11	3	NG	EN CO BSTB (155)	HBCT	WX41AA	AMORY	MS
Apr-11	3	NG	EN CO (278 ACR)	ACR	WX4XAA	COOKEVILLE	TN
10-Aug-10	4	NG	EN CO, BSTB 76TH IBCT	IBCT	WX5JAA	KOKOMO	IN
May-11	3	NG	EN CO BSTB (55/28)	HBCT	WX71E0	SCOTTSDALE	PA
Jun-11	6	NG	1151 ENGINEER SUPPORT COMPANY	ESC	WY0KAA	ANNISTON	AL
Feb-11	4	NG	892 ENG CO (MRBC)	MRBC	WY5UAA	SALINAS	PR
	296						

APPENDIX D
WORKLOAD BREAKOUT

	Date		Hours		Topic	222	hours
	19-Dec		2		Worked Survey Draft		
	19-Dec		1		E-mail/phone exchange with PM		
	20-Dec		3		Worked Survey Draft		
	20-Dec		2		Email exchange with MSCoE. PM		
	21-Dec		2		Worked SRP		
	22-Dec		3		Worked Survey Draft		
	23-Dec		2		Survey		
	27-Dec		1		E-mail and survey feedback from MSCoE		
	28-Dec		1		E-mail		
	28-Dec		1		Survey		
	28-Dec		3		Worked SRP		
	29-Dec		4		Worked SRP		
	30-Dec		4		Worked SRP		
	5-Jan		3		Worked sample size and e-mail coordination		
	6-Jan		2		Worked unit POC and sample size, sent e-mails		
	9-Jan		3		Started corrections to SRP shell		
	19-Jan		2		Worked unit POC and e-mails		
	20-Jan		6		Worked SRP, surveys and unit POCS		
	30-Jan		5		Converted survey to SurveyMonkey		
	31-Jan		6		Looked-up unit addresses, sent out first 7 companies		
	1-Feb		3		Sent out e-mails to units		
	2-Feb		2		Searched and e-mailed unit personnel		
	3-Feb		2		Searched and e-mailed unit personnel		
	7-Feb		2		Modified and added survey questions- worked RBG POC		
	8-Feb		1		Worked RBG distribution and survey monkey		
	9-Feb		5		Modified/added questions to survey, rewrote letter for RBG distributions, again tried to obtain the HMEE distro		
	10-Feb		5		Sorted BHL and HMEE users by UIC and MOS, rewrote the survey cover e-mail		
	13-Feb		4		Built AKO e-mail groups to sort user survey distribution		
	14-Feb		2		Contacted AKO programmers		
	15-Feb		1		Checked e-mail and survey monkey		
	17-Feb		3		Worked data (UIC count), updated report		
	18-Feb		1.5		Worked paper context		
	20-Jan		5		contacted AKO programmers, worked paper content		
	21-Feb		3		Sent out e-mails on AKO to 12H, 12Z and 12X, cut surveys to annexes		
	22-Feb		1		Checked e-mail and survey monkey		
	23-Feb		1		E-mail and survey monitoring		
	24-Feb		2		E-mail and survey monitoring		
	26-Feb		1		E-mail and survey monitoring		
	27-Mar		3		Worked wrport shell		
	28-Mar		3		Contacted AKO rep and worked survey distribution		
	29-Mar		2		Rewrote Survey solicitation letter, Ehecked E-mail		
	5-Mar		5		Split AKO lists for 12Ns and emailed 12Ns, 12Bs,12Hs		
	7-Mar		2		E-mailed 91Bs		
	8-Mar		1		Checked e-mails and survey responses		
	9-Mar		3		Downloaded initial survey results		

	10-Mar		7		Responded to Soldier e-mails, worked report input		
	13-Mar		4		E-mailed 375 91L		
	15-Mar		2		Reviewed inputs to Survey Monkey		
	17-Mar		1		Reviewed inputs to Survey Monkey		
	18-Mar		2		Data review and archive		
	21-Mar		7		Downloaded data and scrubbed results		
	22-Mar		2		Sorted data		
	24-Mar		1		Checked survey responses		
	25-Mar		1		Harvested final operator responses		
	26-Mar		7		Closed data and recut population based on responses, updated MOSs, started input to Chapter 4		
	27-Mar		6		Data review and report input—demographics		
	28-Mar		4		Chart manipulation and report input		
	30-Mar		4		Chapter 4 report input		
	31-Mar		3		Chapter 4 report input		
	02-Apr		11		Chapter 4 report input/submission		
	04-Apr		2		Chapter 5 report input		
	05-Apr		2		Chapter 5 report input		
	06-Apr		6.5		Chapter 5 report input		
	07-Apr		8		Completed Chapter 5 and Acronym List		
	10-Apr		3		Comment inset		
	11-Apr		6		Comment insert		
	12-Apr		3		Final comments, TOC edit, Pagination		
	16-Apr		3		Coordinate parent organization staffing		
	20-Apr		2		Received and reviewed SED comments		
	24-Apr		3		Incorporated SED comments		
	02-May		2		Track staffing and security review		